ARKANSAS STATE CRIME LABORATORY

LATENT PRINT SECTION

QUALITY MANUAL

Executive Director:

Kermit B. Channell, II

SECTION 1 SCOPE

This manual follows the requirements specified by American Association of Crime Laboratory Directors – Laboratory Accreditation Board (ASCLD/LAB) International Program which utilizes the ISO/IEC 17025-2005 standards and 2011 ASCLD/LAB International Supplemental Requirements.

The manual follows the outline of the ASCL Quality Manual (ASCL-DOC-01).

SECTION 2 NORMATIVE REFERENCES

All references listed in this manual are located in the Latent Print section or on the Latent Print S: drive.

SECTION 3 TERMS AND DEFINITIONS

Terms and definitions are located in the ASCL Quality Manual (ASCL-DOC-01).

SECTION 4 MANAGEMENT REQUIREMENTS

4.1 Organization

Chief Latent Print Examiner

Qualifications:

A four year degree from an accredited college or university with a major in forensic science, criminalistics, or in a physical or natural science, or equivalent and five years of technical and professional experience as a Latent Fingerprint Examiner in a forensic laboratory or identification division. The Chief Latent Print Examiner should be an IAI Certified Latent Print Examiner.

Professional experience as a latent fingerprint examiner in a recognized forensic laboratory, institution, or an identification division may be substituted on a one year work time for one year of the required educational background. The individual must have testified as an expert in the field of latent fingerprint identification in a court of law.

Authorities & Responsibilities:

The Latent Print Section Chief will have the overall responsibility for the technical operations and the provision of the resources needed to ensure the required quality of laboratory operations, in addition to the following:

a. Overseeing day-to-day operation of the Latent Print Division, i.e., scheduling workload, supervising analysts, monitoring and reviewing results and case reports. These duties may be distributed among the latent print personnel to facilitate case flow.
b. Establishing professional liaisons with colleagues engaged in latent print testing and research.
c. Conducting informational seminars for the principal users of the laboratory, i.e. judges, prosecutors, police administrators and investigators.
d. Monitoring training programs for the latent print unit personnel.
e. Enforcing safety procedures.
f. Analyzing casework, providing expert testimony, and performing other routine duties of a latent print examiner, (also see Latent Print Examiner job description).

g. Ensuring compliance with the ASCLD/LAB International Requirements within the Latent Print Division and its categories of testing.

Latent Print Examiner

Qualifications:

A four year degree from an accredited college or university with a major in forensic science, criminalistics, or in a physical or natural science or equivalent and one year of professional experience as a Latent Fingerprint Examiner in a forensic laboratory or identification division. In addition, completion of the Arkansas State Crime Laboratory Latent Print Examiner Training Program, as outlined in LP-DOC-02, or a comparable program from another forensic laboratory or institution is required.

The inherent nature of this work demands extreme accuracy and requires considerable initiative and independent judgment. Only those individuals who demonstrate these capabilities will be placed in the position of Latent Print Examiner.

Authorities & Responsibilities:

a. The Latent Print Examiner will analyze and compare latent prints, collect and preserve latent prints and other physical evidence in the laboratory, as well as under potentially adverse conditions at major crime scenes when necessary.
b. Locate, develop, recover and preserve latent impressions on a wide variety of materials and surfaces using physical, chemical, electronic, and optical techniques.
c. Photograph latent impressions using digital imaging equipment.
d. Evaluate and enter suitable latent prints into the Automated Fingerprint Identification System (AFIS).
e. Determine identifications and non-identifications by comparison and verification of each latent print to AFIS candidate lists.
f. Write detailed reports concerning results of analysis.
g. Recover fingerprints, palm prints, and footprints from deceased and decomposed bodies, victims of crime, and potentially violent suspects.
h. Provide training to law enforcement personnel concerning the proper collection and preservation of physical evidence.
i. Testify in criminal legal proceedings as needed concerning methods of analysis and results.
j. The Latent Print Examiner, upon completion of training and competency examination, may be required to record, collect and examine evidence for shoe and tire track comparison.

Latent Print Technician

Qualifications:

Individuals with a high school diploma or equivalent would be considered qualified for the position of Latent Print Technician.

An individual selected as a latent print technician must be able to successfully complete the Arkansas State Crime Laboratory Latent Fingerprint Technician Training Program as outlined in LP-DOC-O6.

The inherent nature of this work demands extreme accuracy and requires considerable initiative and independent judgment. Only those individuals who demonstrate these capabilities will be placed in the position of Latent Print Technician.

Authorities & Responsibilities:

a. The Latent Print Technician will analyze, collect and preserve latent prints and other physical evidence in the laboratory, as well as under potentially adverse conditions at major crime scenes when necessary.
b. Locate, develop, recover and preserve latent impressions on a wide variety of materials and surfaces using physical, chemical, electronic, and optical techniques.
c. Photograph latent impressions using digital imaging equipment.
d. The Latent Print Technician will be permitted to write detailed reports concerning results of analysis.
e. Recover fingerprints, palm prints, and footprints from deceased and decomposed bodies, victims of crime, and potentially violent suspects.
f. Provide training to law enforcement personnel concerning the proper collection and preservation of physical evidence.
g. Testify in criminal legal proceedings as needed concerning methods of analysis and results.

Footwear / Tire Track Examiner:

Qualifications:

A four year degree from an accredited college or university with a major in forensic science, criminalistics, or in a physical or natural science or equivalent and one year of professional experience in a forensic laboratory or identification division. In addition, completion of the Arkansas State Crime Laboratory Footwear/Tire Track Examiner Training Program or a comparable program from another forensic laboratory or institution is required.

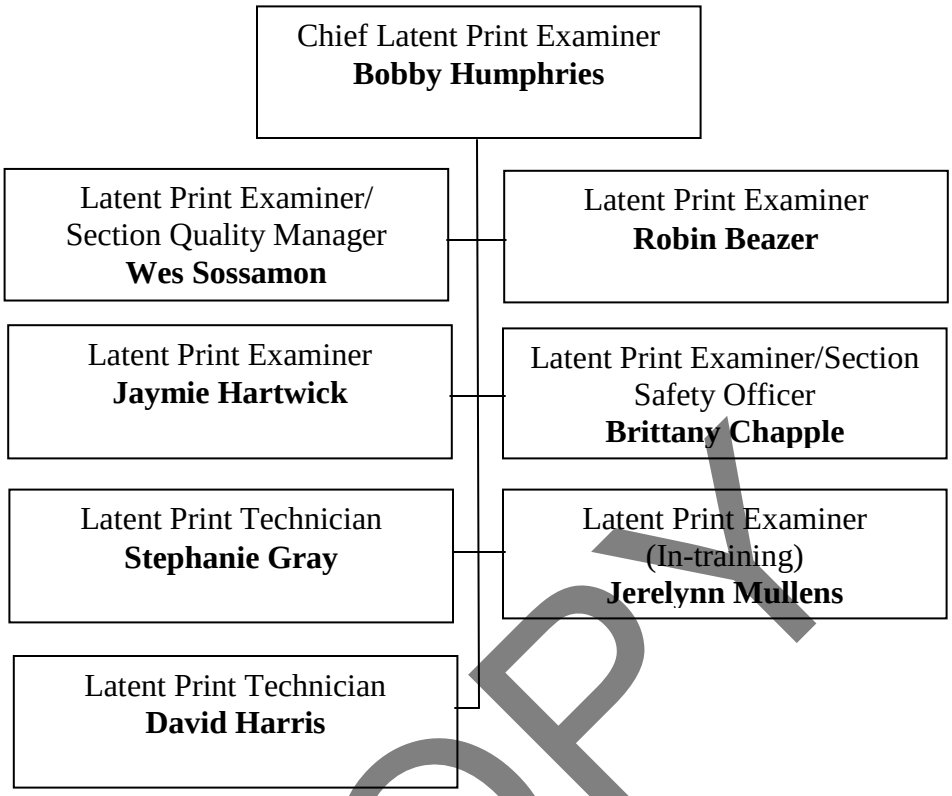
Professional experience as a footwear/tire track examiner in a recognized forensic laboratory, institution, or an identification division may be substituted on a one year work time for one year of the required educational background. The individual should have testified as an expert in the field of footwear/tire track examination in a court of law.

The inherent nature of this work demands extreme accuracy and requires considerable initiative and independent judgment. Only those individuals who demonstrate these capabilities will be placed in the position of Footwear/Tire Track Examiner.

Authorities & Responsibilities:

a. The Footwear/Tire Track Examiner will analyze and compare shoe and tire impressions, collect and preserve shoe and tire impressions and other physical evidence in the laboratory, as well as under potentially adverse conditions at major crime scenes when necessary.
b. Locate, develop, recover and preserve shoe and tire impressions on a wide variety of materials and surfaces using physical, chemical, electronic, and optical techniques.
c. Photograph shoe and tire impressions using digital imaging equipment.
d. Write detailed reports concerning results of analysis.
e. Provide training to law enforcement personnel concerning the proper collection and preservation of physical evidence.
f. Testify in criminal legal proceedings as needed concerning methods of analysis and results.

Latent Print Section Organizational Chart



Each subordinate is accountable to only one supervisor per function.

Section Quality Manager

Qualification:

The Section Quality Manager will be an individual analyst appointed by the Section Chief to ensure that the management system related to quality is implemented and followed at all times.

Authorities and Responsibilities:

a. Maintains and updates the section quality and training manuals.
b. Manages document control within the section.
c. Reviews Employee History Binders semi-annually to verify individual maintenance of necessary documentation.

d. Monitors section practices to verify continuing compliance with policies and procedures.
e. Monitors reagents, standards, and controls and respective logbooks to ensure proper documentation.
f. Evaluates instrument calibration and maintenance records. Periodically assesses the adequacy of report review activities.
g. Ensures the validation of new technical procedures.
h. Investigates technical problems, proposes remedial action, and verifies implementation.
i. Recommends training to improve the quality of the section staff.
j. Proposes corrections and improvements in the quality system within the section.
k. Ensures compliance with the ASCLD/LAB accreditation standards.

Section Health & Safety Manager

Qualification:

The Section Safety Manager will be an individual analyst appointed by the Section Chief to ensure that the management system related to health and safety is implemented and followed at all times.

Authorities and Responsibilities:

a. Assists the Section Chief in teaching safety rules, regulations and procedures within the section.
b. Conducts safety surveys and ensures that proper practices and procedures are being followed.
c. Reviews and evaluates the effectiveness of the section safety manual in conjunction with the safety committee.
d. Recommends and implements changes in safety rules, regulations and procedures to the Section Chief; assists in resolving safety incidents and maintain records of such incidents.
e. Monitors the procurement, use, and disposal of chemicals used in the section.
f. Maintains a current copy of the section MSDS
g. Provides regular, documented formal chemical hygiene and housekeeping inspections including routine inspections of emergency equipment.
h. Seeks for ways to improve the safety program within the section.

The Chief Latent Print Examiner will appoint an examiner to serve as a deputy for key management personnel when the Chief Latent Print Examiner will be absent for three days or longer. All affected personnel shall be notified.

All section employees will be notified of their responsibilities and expectations concerning the objective of the ASCL quality system and will be provided feedback on actual job performance though annual performance evaluations.

Information concerning the quality system will be conveyed by the Chief Latent Print Examiner to all subordinates by means of routine section meetings and / or electronic communication.

4.2 Management System

Latent Print Section Quality Manual

The Latent Print Section Quality Manual (LP-DOC-01) is a compilation of policies and procedures for use in section operations. The purpose of this Quality Manual is to establish general guidelines for the handling of latent print, footwear and tire impression evidence; the examination of latent print, footwear and tire impression evidence; the reporting of latent print, footwear and tire impression examination results; and the response to court commitments.

It is the objective of the Quality Assurance program to:

1. Monitor, on a routine basis, the examinations of the latent print examiners by means of quality control standards and proficiency tests.

2. Verify that all section protocols and procedures are within established performance criteria, that the quality and validity of the examinations are maintained.

3. Ensure that problems are noted and that corrective action is taken and documented.

The quality manual is readily available on Qualtrax to all section personnel. Latent print section personnel are responsible for familiarizing themselves with and utilizing these policies and procedures. The quality manual is reviewed annually by the section QA Manager and Section Chief and updated as needed to reflect changing organizational, technical and procedural information.

Unforeseen circumstances may arise which require immediate deviations from the policies and procedures of this manual. In such situations, the request for exceptions to policy will be submitted in writing to the Latent Print Section Chief. The request must include an adequate description of the circumstances requiring the action, a statement of the proposed alternative policy and procedure, and the intended duration of the exception. The Latent Print Section Chief will maintain documentation of the approved policy exception.

Latent Print Section Mission Statement

Develop latent fingerprints using a full range of physical, chemical and alternative light source methods and compare to prints of subjects in order to identify or eliminate. Compare footwear and tire impressions to suspect footwear and tires. Utilize the

computer based Automated Fingerprint Identification System (AFIS) for searching, matching and storing fingerprints and related data.

Goal

It is the goal of the Latent Print Section of the Arkansas State Crime Laboratory to insure the quality, integrity and accuracy of the examinations as set forth in the Latent Print Mission Statement and to:

1. Provide such services to the Criminal Justice System in accordance with the policies of the laboratory.

2. Provide expert witness testimony for criminal judicial proceedings in accordance with the policies of the laboratory.

The Latent Print Training Manual (LP-DOC-02) will be used for the training of Latent Print Examiners and contains a program detailed to the needs of the ASCL Latent Print Section. This document is located on Qualtrax and is reviewed annually by the section QA Manager and Section Chief and updated as needed to reflect changing organizational, technical and procedural information.

The Footwear / Tire Track Manual (LP-DOC-03) will be used for the training of Latent Print Footwear & Tire Track Examiners and contains a program detailed to the needs of the ASCL Latent Print Section. This document is located on Qualtrax and is reviewed annually by the section QA Manager and Section Chief and updated as needed to reflect changing organizational, technical and procedural information.

The Latent Print Processing Manual (LP-DOC-06) will be used for the training of Latent Print Technicians and contains a program detailed to the needs of the ASCL Latent Print Section. This document is located on Qualtrax and is reviewed annually by the section QA Manager and Section Chief and updated as needed to reflect changing organizational, technical and procedural information.

4.3 Document Control

Controlled Document Preparation
Internally generated documents should be prepared by personnel with adequate expertise in the subject.

Controlled Document Review and Approval

The Latent Print Quality Manual must be reviewed and approved by the Chief Latent Print Examiner, lab-wide QA Manager, Scientific Operations Director and Executive Director.

All other discipline specific documents will be reviewed and approved by the Chief Latent Print Examiner and the lab-wide QA Manager.

Individuals may print hardcopies of internal documents as needed for personal use; however, these copies are unofficial. Official documents will be maintained on Qualtrax.

Control of External Documents
External documents, software, or any other document in which a particular revision/version is required, will be referenced in the appropriate internally generated controlled document (i.e. Latent Print Section Quality Manual, Latent Print Training Manuals, etc.) or as an attachment to the appropriate document. The reference must identify the current revision/version required. These documents will be available in the Latent Print Section AFIS Room or on the S: drive.

Document Availability
Documents shall be available at all locations where operations essential to the effective functioning of the laboratory are performed (i.e. annex building, crime scenes, etc.). A copy must be the most recent edition of the document.

Archiving Controlled Documents
Employees will destroy outdated documents upon receiving updated documents. Immediate and proper disposal is required (i.e. the Shred-It Confidential Paper Shredding and Recycling System located in the AFIS room). It is the employee's responsibility to verify that they are using the current revision of any document.

Document Changes
Revised documents are subject to the same review, approval, documentation and issuance requirements of the original document as stated above.

The Preparer of the document is responsible for:

Preparing the document in the proper format.

Submitting the document on QualTrax for internal review.

Addressing or resolving comments from reviewers.

The Section Chief is responsible for:

Ensuring that Quality and Training Manual reviews are completed annually.

Reviewing and approving all discipline specific controlled documents.

Ensuring that the documents are scientifically suitable for issue.

Ensuring that the documents contain the required quality assurance elements (i.e., QC, measurement of uncertainty, traceability)

4.4 Review of Requests, Tenders, and Contracts

General

The *ASCL Evidence Submission Form* (ASCL-FORM-12) shall normally be utilized to record the request, tender and contract with the customer.

Refer to the ASCL Quality Manual (ASCL-DOC-01) for the definitions of "request", "tenders", and "contracts".

Review of Requests

The customer should be contacted with any questions related to the agency's request. Case-related discussions with the customer concerning specific results of an examination, details of the crime directly affecting analytical methods, and any changes to the existing request will be documented on the *Agency Contact Form* (ASCL-FORM-06), e-mail, or equivalent document. These documents will be entered into the JusticeTrax case file under the Case Images section.

Before analysis begins, an initial review is conducted by Evidence Technicians followed by a second review conducted by the Section Chief and/or analyst to determine if there is anything more specific about the request and to determine if the laboratory has the capability and resources to perform the services requested (i.e. adequate standards, controls and approved test methods). The customer will be notified (e.g. iResults, phone call, e-mail, etc.) if a request is cancelled, resulting in no analysis being performed.

Medical Examiner Latent Print Requests

Requests for identification of deceased individuals from the Medical Examiner's office are initiated by a phone call to an analyst in the Latent Print Section. Upon analyst assignment to the case morgue technicians initiate an LP/ME Identification request in Jtrax. Any postmortem prints and appendages collected by the LP analyst to assist in identification efforts will be handled as evidence. After print examination and analysis is complete, any postmortem prints will be transferred to the Evidence Receiving Section and any appendages will be transferred to morgue personnel.

Amendments

If the contract needs to be amended after work has begun, all affected personnel shall be notified.

4.5 Subcontracting of Tests and Calibrations

See ASCL Quality Manual (ASCL-DOC-01).

4.6 Purchasing Services and Supplies

When the material or service must meet certain specifications in order to correctly perform the testing, these items and their specifications (i.e. manufacturer, type, grade or other technical data relevant to the supply or service) will be documented in the External Supply Request workflow located in Qualtrax.

Inspection and Verification of Supplies Received

Supplies, reagents and consumable materials that affect the quality of tests are not used until they have been inspected or otherwise verified as being in compliance with specifications established.

The Procurement Section inspects all materials received to ensure agreement with what was ordered. Inconsistencies will be reconciled before materials are dispersed to the appropriate section and utilized in casework. The Latent Print Section Chief or designee will verify (if applicable) that the materials meet the required specifications. This approval will be documented in Qualtrax in the External Supply Request workflow.

Chemicals and reagents are to be initialed and dated with "Received Date" by Procurement staff. As chemicals and reagents are requested, the analysts are responsible for initialing and dating containers with "Open Date". Supplies, reagents and consumable materials shall be stored in accordance with the manufacturer's recommendations.

Inconsistencies will be reconciled before materials are utilized in casework.

As chemicals and reagents are requested, the analysts are responsible for initialing and dating containers with "Open Date". Supplies, reagents and consumable materials shall be stored in accordance with the manufacturer's recommendations.

4.7 Service to the Customer

See ASCL Quality Manual (ASCL-DOC-01).

4.8 Complaints

External Complaints

Any staff member receiving a complaint should notify their supervisor. The complaint shall be documented and given to the supervisor. The supervisor shall forward the complaint to the Scientific Operations Director who will investigate the situation and notify top management when necessary.

When the concern takes on the nature of a complaint about the laboratory's activities or deficiencies in the quality system, the supervisor will investigate the situation and forward all the information to the QA Manager.

See ASCL Quality Manual (ASCL-DOC-01).

4.9 Control of Nonconforming Testing

All employees and supervisory personnel must be vigilant for any indication of nonconforming tests and work.

For Level 1 and Level 2 Non-Conformities, the Latent Print Section Chief and lab-wide QA Manager will be notified immediately for consultation and to evaluate the significance of the nonconforming testing or work. A Corrective Action Request workflow in Qualtrax will be initiated.

Refer to ASCL-DOC-01 for definitions and levels of non-conforming work.

4.10 Improvement

The Latent Print Section shall strive to continually improve the effectiveness of the Latent Print Quality Management System. Opportunities for improvement are identified through various sources, including:

- Annual review of policies and procedures located in the section quality and discipline training manuals (LP-DOC-01, LP-DOC-02, LP-DOC-03, LP-DOC-06).
- Section employee suggestions.
- Annual section personnel training.
- Complete case data reviews will be conducted for each individual latent print analyst within their respective discipline areas at the time of the annual ASCL internal audit.

4.11 Corrective Action

Refer to ASCL-DOC-01.

4.12 Preventive Action

Refer to ASCL-DOC-01.

4.13 Control of Records

Record Storage and Retention

Historical non-electronic case files for the Latent Print section are stored in the shared discipline area, the file room in the main building, the evidence storage area in Evidence Receiving, the file rooms located in the annex, or off-site storage.

Discipline Quality Records

Discipline quality records, such as the Reagent logbook and the Reagent Daily Use Verification Logs, will be stored in the discipline and accessible to employees in the discipline.

Technical Records

Examination records are any records generated by the analyst/examiner for a case file (e.g. notes, worksheets, photographs, spectra, printouts, charts and other data). Examination records that are essential for the evaluation and interpretation of the data must be stored in the appropriate folder within the 'Request' folder in the LIMS case file. The unique Arkansas State Crime Laboratory (ASCL) case number (YYYY-00000) (handwritten or electronically generated) and the analyst's handwritten initials or secure electronic equivalent of initials or signature must be on all examination records in the case file.

When it is not feasible to incorporate the original examination records (i.e. digital, scanned, and / or processed images) in the LIMS case file, these records may be stored external to the LIMS case file in archived Morehits® / Foray® image files or the Foray® Digital Workplace imaging system. The location of these records will be specified in the case file.

Latent print images captured in Foray™ More Hits prior to 2008 will be archived on suitable media. Current Foray Digital Workplace™ images will be backed up and archived on suitable recording media and maintained off site on a weekly basis. Original images are secured by Foray™ and will remain unchanged.

All other records contained in the case file will be considered administrative records and will be stored in the 'Case Images' folder in the LIMS case file. The unique Arkansas State Crime Laboratory (ASCL) case number (YYYY-00000) (handwritten or electronically generated) must be on all administrative records in the case file.

Each case record will contain enough information to identify factors to enable re-analysis to be conducted under conditions as close to the original as possible. The identity of the individuals who sampled evidence, conducted testing, and/or verified results will be reflected in the case record.

When the analyst/examiner has completed the request, they will set the milestone(s) in JusticeTrax to 'draft complete.' Examination records for a request will be considered "completed" once the request has been 'draft completed' in Justice Trax. If a change to the examination record is made after this milestone, the original record will remain in the electronic case file and the changed record will be stored with a different name (i.e. amended notes, etc.).

Data Recording

Observations, data and calculations shall be recorded at the time they are made and shall be identifiable to the specific task.

Dates should be recorded throughout the records to indicate when the work was performed. Both the assignment (start) date and the completion date will be displayed on the first page of each Latent Print documentation request generated in Foray™ Adams Web documentation system.

If using the Latent Print documentation worksheets, both the case start date and the examination completion date will be written on the first page of the Latent Print Case Notes (LP-FORM-17) worksheet. Each additional worksheet (i.e. Latent Print Worksheet (Processing) LP-FORM-20, Latent Print Worksheet (Lifts/Images) LP-FORM-19, etc.) in the case file will be dated when that analysis or process was performed.

Comparisons must result in one of three conclusions (refer to section 5.10 of this manual for more descriptive definitions):

a) Individualization (two impressions are from the same source)
b) Exclusion (two impressions are not from the same source)
c) Inconclusive (unable to identify or exclude)

Comparison documentation to support conclusions made by the examiner must be included in the case record. The documentation must be sufficient to allow another competent scientist to evaluate what was done or interpret the data and may be in the form of notes, sketches, charts, images, annotated images, etc.

If someone other than the assigned examiner processed any evidence or performed analysis on any portion of the examination, that person must be identified in the case record.

a) This may be done by that individual producing their own notes/documentation for the case record, the initials (or electronic equivalent) of that individual being on the pages of examination documentation representing their work or that individual making an entry in LIMS.

Significant consultation between examiners must be documented in the case record. A significant consultation is considered to be a consultation that would have the potential for significant contribution or impact on the decision making process when examining latent prints (i.e. "value/no value?", "sufficiency to identify an individual?", "presence of complex distortions?" etc.). Consultations such as "search as a finger or palm?", "which direction to orient a latent print for searching?" etc. would not be considered "significant" and would not need to be documented (although depending on the case details it may be desirable to do so). The documentation must include the following minimal information:

b) The nature of the consultation and any opinions rendered (this may be very brief or detailed depending on the circumstances).
c) The date(s) of the consultation.
d) Confirmation by the consulted examiner on the consultation description and any opinions rendered. This may be done by the consulted examiner producing his/her own notes/documentation for the case record, initialing the consultation description in the case record or making an entry in LIMS.

Ridge detail determined to be suitable must be assigned a latent print designation. Assignment of the designator should be as consistent as possible (although may occasionally vary depending on case circumstances). This designation should ideally reference the Item number or marked object that is part of that Item number. (Example: Item 3 consists of five latent print lifts. The examining analyst has marked the latent lifts 3A through 3E. There are two latent prints suitable for comparison on latent lift 3B. The examiner should designate those latent prints as "3B-L1" and "3B-L2" for the case record.)

The Foray™ ADAMS Latent Case Management and ACE-V Documentation (Latent/ACE-V) Module ensures complete compliance with SWGFAST's ACE-V guidelines, and provides an intuitive, browser-based process for documentation required as part of the latent case management record. The ASCL Latent Print Section examination records will be generated in the Foray™ Adams documentation system and shall include each examination activity conducted, the sequence of those activities and the results of the activities. Activities include development techniques applied, controls or reagent checks used in development techniques, photography/digital imaging used, any automated fingerprint identification (AFIS / IAFIS) searches conducted, known friction skin

impression/image(s) (exemplars) capture and/or retrieval, comparisons conducted and conclusions reached.

Examination records shall include which prints were analyzed, compared, evaluated and conclusions reached. Examination records shall acknowledge the existence and disposition of any captured latent prints which are not analyzed, compared or evaluated.

When individualization is made from an exemplar that has been submitted for comparison with latent prints, the original or a legible reproduction of the known exemplar shall be retained in Foray Digital Workplace™ as part of the case record. If an individualization occurs using an individual characteristics database (AFIS) record, the known exemplar need not be imaged into the FORAY database as the AFIS record can be reproduced.

Images of the latent prints determined to be of value are needed for another competent analyst to evaluate what was done or interpret the data. Original latent prints, or legible copies shall be maintained in the case record. Those original latent prints which have no value for comparison or which were not examined are not required to be maintained in the case record and will be left to the discretion of the individual analyst working the case.

Digital images of latent prints and known exemplars may be included as examination records.

When annotations are made on original evidence, latent print lifts or photographs/digital images of latent prints, the lifts and/or photographs/digital images with the annotations or a legible copy thereof shall be retained as examination records. Annotations may include, but are not limited to, designations of latent prints of value, markings regarding an identification, charting, etc.

When a latent print *developed* on an item of evidence cannot be sufficiently imaged or lifted, the item of evidence or its packaging must be marked indicating that the print must be protected from loss.

Handwritten notes and observations must be in ink. However, pencil may be appropriate for diagrams or making tracings. Nothing in the handwritten information will be obliterated or erased.

Any corrections will be made by an initialed, single strikeout (so that what is stricken can still be read) by the person making the change. Correction fluid or correction tape may not be used.

Verification of Tests

Verification is an independent examination of the evidence by another competent analyst to either support or refute the conclusions of the original examiner.

All identifications and exclusions of any friction ridge detail, footwear, or tire track comparisons will be verified. Verifications shall be performed by another analyst qualified in the same discipline/sub-discipline and will be clearly documented on the appropriate discipline/sub-discipline notes worksheet in the case file.

If the verifying analyst draws the same conclusion as the primary analyst, documentation shall be clear as to what was verified, who performed the verification and the date the verification was performed.

Verifications will be documented in the case file as follows:

For individualizations:

a) The verifier must document the verification by indicating the source's name and corresponding area of the known exemplar (i.e., which palm or finger number) and the date the verification was completed in the case record. This may be done by marking each individual identification verification, a summary of identification verifications, a statement in the case record regarding the identification verifications, or case notes specific to each comparison.
b) Any verification case notes generated must be included in the case record.
c) Verifications done between Laboratories must be documented by printing out the relevant page of the case record from LIMS, marking the verification and rescanning the page into LIMS as verification documentation.

For exclusions:

d) The verifier must document the verification by indicating the source's name, excluded items or latents, and the date the verification was completed in the case record. When limited exclusions are conducted, the corresponding area of the known exemplar (i.e., which palm or finger number) will be indicated. This may be done by marking each individual exclusion verification, a summary of exclusion verifications, a statement in the case record regarding the exclusion verifications, or case notes specific to each comparison.
e) Any verification case notes generated must be included in the case record.
f) Verifications done between Laboratories must be documented by printing out the relevant page of the case record from LIMS, marking the verification and rescanning the page into LIMS as verification documentation.

Verification documentation on examination material (i.e. lifts, exemplars, etc.) when applicable shall include the initials of both the primary and confirming analysts, the dates associated with each analyst's independent conclusion, and a clear indicator of

what was verified (i.e. subject's name, finger number, right or left palm, specific shoe, etc.).

Conflict Resolution

If the verifying analyst draws a different conclusion from the primary analyst, both analysts shall attempt to come to a resolution. If a resolution cannot be achieved, the issue shall be brought to the attention of the Section Chief. The Section Chief shall consult with the involved parties and resolve the issue. In the case of an off-site confirmation, the same requirement for documentation applies.

Abbreviations may be used in examination records. The Latent Print Section Abbreviations list (LP-DOC-05) is located on Qualtrax.

4.14 Internal Audits

Refer to ASCL-DOC-01.

4.15 Management Reviews

Refer to ASCL-DOC-01.

SECTION 5 TECHNICAL REQUIREMENTS

5.1 Reagents/Chemicals/Controls

The following rules shall be followed for reagents, chemicals and controls:

- Items with a manufacturer-specified expiration date may not be used after that date without documentation to support continued reliability.
- For items without a manufacturer-specified expiration date, dates will be based on experience, industry standard, or scientific consensus.
- Appropriate logs must be maintained within each discipline for reagents and standards used.
- Each analyst must ensure that the controls, reagents and/or chemicals used in their analysis are of satisfactory quality.
- Controls, reagents, or chemicals which are determined not to be reliable must be removed from use immediately.

*The reliability testing shall occur before use or, if appropriate, concurrent with the test. Note: Non-routine reagents prepared for one time use may be recorded with the above items in the laboratory case notes and any excess reagent discarded after use.

- Chemicals and solvents used in reagents should be of at least American Chemical Society (ACS) reagent grade.
- Water used in reagent preparation should be deionized (DI)
- Stock solutions of general test reagents will be prepared using good laboratory practices as needed. After being made, they will be checked as appropriate with the control listed below in Table 1 and the date the reagent verification is completed will be documented in the Latent Print section's Reagent Logbook.

Table 1: Common Reagents and Appropriate Check Compounds

Reagent	**Control**
Amido Black	Known dried blood sample on substrate
Gentian Violet	Friction ridge skin residue on sticky side of tape
Ninhydrin	Friction ridge skin residue on porous substrate
Rhodamine 6G	Friction ridge skin residue processed with Cyanoacrylate Ester on non-porous substrate
Gun Blue (Perma Blue)	Friction ridge skin residue on metal

	ammunition

Reagents will also be checked daily prior to use in case work, as appropriate, and documented in the case notes as well as the Reagent Daily Use Verification Logbook. If reagent does not meet standard, it will not be used, and a new solution will be prepared. Reagent verification will be conducted with the new solution to determine if it is working properly and documented in the Latent Print Reagent Logbook.

See ASCL Quality Manual (ASCL-DOC-01) for proper documentation and labeling requirements of reagents.

5.2 Personnel

General

The Chief Latent Print Examiner shall ensure the competence of all who operate specific equipment, perform tests, evaluate results and sign test reports. Training will be completed under the supervision of competent and experienced latent print examiners..

Training Program

A Latent Print section trainee must be able to successfully complete the appropriate Arkansas State Crime Laboratory Latent Print Training Program or a comparable program from another forensic laboratory or institution. The training program will be a minimum of 3-12 months depending on the concentration (Processing vs. Examination) and the completion of any assigned readings, practical exercises, competency tests, courtroom observation and supervised casework will be documented. At the conclusion of training, the Chief Latent Print Examiner shall document (e.g. memo, letter, etc.) that the individual has been properly trained and that their ability to perform the particular testing has been assessed. This record shall be kept in the individual's Employee History Binder.

Past work experience and training may be substituted for the training program to the extent that it has been demonstrated to be relevant and sufficient, with the approval of the Latent Print Section Chief and Scientific Operations Director.

Job Descriptions

Current job descriptions for personnel involved with testing shall be maintained in their Employee History Binder.

Authorization Documentation

The Chief Latent Print Examiner shall authorize personnel to perform sampling, testing, issuing of reports, and operating particular types of equipment after the completion of training. This competency documentation shall be dated and signed by the Section Chief and maintained in the Employee's History Binder.

Technical Personnel Qualifications

Education

Analysts working in the Latent Print discipline shall possess a four year degree from an accredited college or university with a major in forensic science, criminalistics, or in a physical or natural science or equivalent and one year of professional experience as a Latent Fingerprint Examiner in a forensic laboratory or identification division. The educational requirement may be waived for analysts working in the discipline prior to December 2004.

Technicians working as technical support in the Latent Print discipline shall possess a high school diploma or equivalent.

Competency Testing

For analysts whose job responsibility includes report writing, a competency test shall include, at a minimum:

- Examination of sufficient unknown samples to cover the anticipated spectrum of assigned duties and evaluate the individual's ability to perform proper testing methods;
- A written report to demonstrate the individual's ability to properly convey results and/or conclusions and the significance of those results/conclusions; and
- A written or oral examination to assess the individual's knowledge of the discipline, category of testing, or task being performed.
- Moot court to demonstrate the individuals' ability to properly convey and present results of evidence in court.

A moot court will be required following the successful completion of each applicable Latent Print training program. Moot court may be waived for analysts receiving training in additional categories of testing within the same discipline.

The Latent Print Section maintains and provides access to literature resources such as relevant books, journals and other literature dealing the discipline. Analysts shall document the literature they review on a semi-monthly basis (every three months) in the electronic LP Literature Review Log sheet maintained on the S:drive.

5.3 Accommodation and Environmental Conditions

Access/Security

The latent print section consists of eight office areas, the AFIS room (which includes the AFIS/ IAFIS, digital imaging station and the division printer), the powder processing room, the chemical processing room, and the ALS/reagent storage room. The eight offices and processing rooms may serve as a temporary secure storage facility for evidence controlled by an individual analyst.

Access to the two office areas outside the main portion of the latent print section requires a key. Access to the main portion of the latent print section is access controlled by security fobs. The remaining six offices located in the main latent print section require a key.

Health and Safety Program

The laboratory has a Health and Safety Manual (ASCL-DOC-08) that must be followed by all employees and guests. Employees not following the safety guidelines as spelled out in the safety manual will be subject to disciplinary action. Guests will be asked to leave or conform to the safety regulations.

5.4 Test Methods and Method Validation

General

Visual examination of evidence is the first step in the processing procedure. Visual examination is the inspection for latent print residue that may be preserved photographically or determined to be unsuitable as it exists. In addition, visual inspection is the mechanism by which processing procedures are selected from observation of the residue, its condition, and composition, and of the article. Expertise is the ability of an examiner to determine as many factors as possible and to select examination approaches accordingly. Examination documentation shall include each examination activity conducted, the sequence of those activities and the results of each examination activity. Examination activities include: development technique applied, photography/capture, AFIS/IAFIS search, and comparisons made.

Judgment of factors in the selection of processing approaches must be both tempered and augmented by a basic philosophy toward evidence examination. Seeking a visualization of latent print residue, which may or may not be present, without tangible proof, creates a common dilemma regarding the extent of the pursuit. Negative results with any given technique are not a sure indication of non-existence and positive results with any given procedure do not provide assurance that the examination is complete. A basic philosophy which demands that exploration continues until all avenues are exhausted or until what is sought is found should guide all evidence examination procedures. Fixed methods of even the best intentions requiring minimum processing steps, check lists, or pre-determined consequences are no substitute for dedicated and reasoned logic to find what is sought, the identity of the suspect whenever possible.

The ASCL facilities provide sufficient environmental conditions to conduct all tests listed in this Procedures Manual with no further consideration required.

This section of the ASCL LP Quality Manual is arranged according to protocols for various types of substrate materials and residues encountered in latent print processing. It contains further descriptions when surface condition and/or deposit factors are a major influence upon technique selection. Additional factors may require some modification or adjustment to the technique or sequence of techniques indicated. In some instances procedures which fall into the general processing guidelines for a particular substrate but are inappropriate or destructive due to other factors should be modified so as to accomplish the best possible processing sequence for that specific item. This manual can not list every substrate an examiner will encounter in casework and all procedures are subject to revision as new techniques or research reveals improvement.

If it becomes necessary to make a deviation from a documented method and/or procedure, it must be technically justified and authorized by the LP Section Chief. The deviation will be documented in the case record. Each Section Chief will keep a log of method/procedure deviations.

Selection of Methods

The ASCL shall use test methods that meet the needs of the customer and are appropriate for the tests undertaken. Standard Methods, Laboratory-Developed Methods or Non-Standard Methods may be utilized in casework after the appropriate validation and/or performance verifications have been performed as described in the labwide manual. The most current version of the method must be documented and readily available to the analyst for reference unless it is not appropriate or possible to do so.

Validation of Methods

Refer to the labwide manual.

Electronic Data

Latent print images captured in Foray™ More Hits prior to 2008 will be archived on suitable media. Current Foray Digital Workplace™ images will be backed up and archived on suitable recording media and maintained off site on a weekly basis. Original images are secured by Foray™ and will remain unchanged.

5.4.1 Inherent Luminescence

INTRODUCTION

The use of alternate light sources in conjunction with various chemical techniques and dyes has proven very effective in visualizing latent impressions. Substances found in latent print residue may luminesce when illuminated by the proper wavelength of light and viewed with the appropriate filters. B-vitamin complexes, that are a natural component of perspiration, may be the cause of this reaction. Various contaminants such as cosmetics may become part of latent print residue and may inherently luminesce as well. Additionally certain materials such as styrofoam and galvanized or zinc plated metal are observed to consistently produce impressions that will luminesce without the application of chemical processing or dyes. This inherent luminescence allows for examination of items that may be destroyed by other techniques.

Proper safety precautions including avoiding skin exposure and proper eye protection with appropriate optical densities should be utilized when operating ultraviolet light sources, or alternate light sources. Consult the appropriate user's manuals for the safe use and appropriate eye protection for the specific piece of equipment being utilized.

PREPARATIONS

No specific preparations required.

INSTRUMENTATION

Alternate Light Source

MINIMUM STANDARDS AND CONTROLS

Not Applicable.

PROCEDURE OR ANALYSIS

The procedure for this technique consists of examining the item with the alternate light sources using appropriate filtration. Common wavelengths used are 450 nm, 485 nm and 530 nm. In most cases an orange barrier filter is appropriate for examination. Some success may be seen with the use of ultraviolet light sources and the various wavelengths produced by alternate light sources. The examiner must choose the appropriate filters and eye protection for these light sources and the wavelengths selected.

INTERPRETATION OF RESULTS

Items can be examined for inherent luminescence without destruction of the item. Photographic preservation of developed impressions which may be of value for individualization is essential and must be accomplished as soon as possible. In addition many surfaces should be routinely examined using this technique as it has been shown

to produce consistent results. The item being examined may luminesce and this background luminescence may improve the contrast of visible impressions much as the use of metal salt post treatment of ninhydrin developed impressions. This non-destructive process is a relatively simple technique that has been proven to be very successful in producing positive results.

5.4.2 Ninhydrin-Porous Items

INTRODUCTION

Ninhydrin, or triketo-hydrindene hydrate, is an extremely sensitive indicator of alpha-amino acids, proteins, peptides and polypeptides. The reaction produces a violet to blue-violet coloring of these substances and is effective even with older deposits and/or minute amounts of amino acids. While ninhydrin can be used on any surface, processing normally is confined to porous items which are not water-soaked and do not contain inherent animal proteins.

PREPARATIONS

Ninhydrin is readily soluble in most organic solvents. Working solutions of ninhydrin are governed by the nature of the solvent and the strength of the solution. Concentrations of the ninhydrin solution may vary according to application, but generally a 0.5% to 1.0% weight to volume mixture produces the best results. A 0.5% concentration is recommended for routine porous item processing. Ethanol, methanol, petroleum ether, and acetone have high damage potential but are acceptable for non-document porous material. Any of the listed solvents may be used at the examiner's discretion. Commercially prepared ninhydrin may be used, no specific preparation is needed.

Recommended Preparation - 0.5% concentration:

Petroleum Ether

Chemicals Required

- 10 grams Ninhydrin
- 60 ml Methanol
- 80 ml 2-Propanol (Isopropyl Alcohol)
- 1860 ml Petroleum Ether (Fill measured beaker to the 2000 ml Level)

Directions

1. Dissolve Ninhydrin crystals in Methanol.
2. Add 2-Propanol to Ninhydrin/Methanol solution and stir.
3. Add Ninhydrin, Methanol, 2-Propanol solution to Petroleum Ether and stir.

Acetone

Chemicals Required

- 25 grams Ninhydrin
- 4 liters of Acetone

Directions

Dissolve Ninhydrin crystals in Acetone.

Stock Solution

Chemicals Required

- 25 grams Ninhydrin
- 300 ml Ethyl alcohol (use Absolute Ethanol , DO NOT use Denatured Ethanol)

Directions

Dissolve Ninhydrin crystals in Ethyl alcohol.

INSTRUMENTATION

A humidity chamber or a steam iron may be used to control the heat and relative humidity to accelerate the development of latent prints after processing.

MINIMUM STANDARDS AND CONTROLS

Process a test strip. If the test strip turns purple the working solution can be used to process evidence. This testing procedure must be performed for each working solution at the time the solution is made. Documentation of this process must be done in the form of a reagent log to include a lot number. If additional batches are made on the same day, add an alpha character to the lot number (#####a, b, c, etc.). The lot number must be placed on the original/working container. Documentation of this process must be included in the reagent logbook by placing the date and initials of the preparer (chemist) adjacent to the quantity made and by recording the lot number. The LP verifying analyst must initial by the preparer's documentation, indicating a positive reaction with a test material. This test shall also be performed for each day that the reagent is needed. Documentation of this process will be entered in the Daily Reagent Verification Logbook by the LP analyst initialing adjacent to the test date and by recording the batch number. Reagent shall be stored in a dark bottle and have a shelf life not exceeding one (1) year.

PROCEDURE OR ANALYSIS

All applications should be done in a fume hood.

Dipping

Completely immerse each item to be processed in the working solution until the item is completely saturated, usually five seconds or less. The item can be manipulated using tongs or forceps.

Remove and allow the item to dry completely.

Place the item in the heat/humidity chamber at no greater than 80 degrees Celsius/176 degrees Fahrenheit and between 60% and 80% relative humidity; or

the item may be steam ironed. A certified hygro-thermometer must be utilized to monitor the heat/humidity levels in the chamber.

Check the item periodically to monitor the impression development. Care should be taken not to saturate the item with water vapor.

Brushing and Spraying

Larger items which will not fit conveniently into processing trays can be saturated with the ninhydrin solution using a soft bristle paint brush. The items may also be processed by spraying. Spray the item until saturated and air dry; then follow the instructions detailed in the dipping procedure post drying.

INTERPRETATION OF RESULTS

Ninhydrin coloration is not permanent, and while some impressions have remained visible for years, others have faded in a matter of days. Photographic preservation of developed impressions which may be of value for individualization is essential and must be accomplished as soon as possible.

REFERENCES

1. Cowger, James F. *Friction Ridge Skin Comparison and Identification of Fingerprints*; Boca Raton: CRC Press, 1993.
2. Lee, Henry C.; Gaensslen, R. E., eds. *Advances in Fingerprint Technology*; CRC Press LLC, Boca Raton, FL, 1994.
3. Lennard, Christopher J.; Pierre A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints"; *Journal of Forensic Identification*, September/October 1988, 38, 5, pp 197-210.
4. Olson, Robert. *Scott's Fingerprint Mechanics*; Charles C. Thomas Publisher; Springfield, IL, 1978.
5. Lee, Henry C. and R.E. Gaensslen., eds. *Advances in Fingerprint Technology.* Boca Raton: CRC Press, 2001.
6. Hewlett, D. F.; Sears, V. G. "Replacement for CFC113 in Ninhydrin Process", *Journal of Forensic Identification*, 47(3), 1997, p287.
7. Watling, W. J. and Smith, K. O., "Heptane, an Alternative to the Freon Ninhydrin Mixture," *J. Forensic Identification,* 43(2) 1993, p. 131.
8. Wertheim, Pat A. "Ninhydrin: Basic to Advanced," Forensic Identification Training Seminars, Ltd., Iowa Division for International Association for Identification, 2008; http://www.iowaiai.org/ninhydrin_basic_to_advanced.html
9. FBI Processing Guide for Developing Latent Print, 2000; http://onin.com/fp/fbi_2000_lp_guide.pdf

5.4.3 Powders

INTRODUCTION

Fingerprint powders are very fine particles with an affinity for moisture throughout a wide range of viscosity. Palmar sweat, grease, oil, and most contaminants that coat the surface of friction ridge skin possess sufficient moisture and viscosity to attract and bind the fine particles together. Contact between friction ridge skin and a non-porous surface will sometimes result in a transfer of the skin coating to that surface. The non-absorbency of the surface prevents penetration by the deposited moisture. All fingerprint powders are indiscriminate in adhesion to moisture. Surfaces coated with residue in addition to suspected latent prints will attract powders all over the surface

Dependent upon the composition of the residue, the deposited moisture will range from a most apparent appearance to the barely perceptible or invisible, even under oblique lighting. Powder application is the effort to produce or improve the appearance for preservation.

The most effective agent in terms of adherence to moisture, non-adherence to dry surfaces, particle size, shape, uniformity, and intensity of color is carbon. Carbon is black, and as a result, black powders which contain carbon will consistently produce the best results. Most commercial black fingerprint powders have a high carbon base. According to the manufacturer's particular formula and production methods, the carbon base may be from a variety of sources, including lamp black, bone, or wood charcoal. Commercial powders contain milled carbon of highly uniform size and shape along with additional ingredients to preserve the milled condition and retard moisture absorption. Other colored powders may be required due to the substrate encountered, but should be restricted to absolute necessity.

Magnetic powders are powder-coated, fine iron filings subject to magnetic attraction. These adhere to moisture to a lesser degree than carbon powders, but can be applied with less destructive force to the surface.

Redwop fluorescent powders have a lycopodium base and were developed specifically to be luminescent - excited by light sources emitting blue-green light. Redwop fluorescent powder is recommended as a primary use fluorescent powder for examination of latent prints with forensic light sources and ultraviolet light sources.

PREPARATIONS

No specific preparations are needed as the powders and materials being used are commercially prepared.

INSTRUMENTATION

No specific instrumentation is involved in powder processing.

MINIMUM STANDARDS AND CONTROLS

The Standards and Controls for the Powders consist of insuring that the powders being used are in the proper condition. Powders should not be exposed to high humidity or moisture. Powders may clump if exposed to excessive moisture or contaminants. Moisture content and contaminants may be minimized by keeping the stock container closed as much as possible and using containers with small amounts of powder. This will minimize the moisture content as well as reduce any contamination of the stock container with substances from the item being processed. The date the container is opened is to be used as the batch number, established by month/day/year (060404). If additional containers are opened on the same day, add an alpha character to the batch number (060404a, b, c, etc.). The batch number shall be placed on the original and working container and in the examiner's notes. Shelf life is indeterminable; however, if clumping of the powder is observed, it shall be discarded.

PROCEDURE OR ANALYSIS

Standard Powders

Powders may be applied by various means, but the preferred procedure for most items is the use of a brush. Fiberglass brushes are the easiest to use and maintain while permitting application over a wider area. Powders are more effective if applied in very small amounts. While some examiners prefer pouring a supply of powder into a secondary container or a piece of paper, direct contact between brush and powder container is acceptable. Only the ends of the brush bristles should be coated with the powder, and the brush should be gently tapped several times to remove all but a minimum amount.

With the brush handle in a nearly perpendicular position to the surface, the bristle ends are lightly and delicately moved over the surface. Discoloration of the latent print residue will usually appear immediately. With a fiberglass brush and a proper amount of powder, the impression will develop in density with each light pass until no further development can be observed. Even slightly excessive amounts of powder will cause a fill to occur between ridges. This fill must be removed with continued brush strokes until the impression is as free of extraneous powder as possible. Except on highly polished surfaces, excessive brushing is rare with a fiberglass brush. However, at the first indication that the impression is being removed, all further brushing must cease.

Extraneous residue on the surface may cause a general painting effect which obscures friction ridge detail. A lift made of the area can sometimes remove the extraneous material and permit a second application of powder. This second application may offer better contrast between latent print deposit and the background.

Magnetic Powders

Magnetic powder must be applied with a magnetic application device. Wands which contain a movable magnet attract the powder when the magnet is depressed and release the powder when it is raised. Contact between powder and surface is completed without bristles and is more light and delicate than the fiberglass brush. However, the particle size, larger than standard powder, has a tendency to paint some surfaces. Excessive powder can sometimes be removed by passing the magnetic wand without powder near the surface. Since the magnetic attraction holding the iron particles is relatively weak, the supply can be depleted quickly. Surface areas examined generally must be processed more slowly with magnetic powders, and great care must be exercised to prevent actual contact between the end of the wand and the surface.

Redwop Powder

Redwop powders are applied in the same manner as standard powders. It is not recommended to make a lift of the latent print but view with a light source. If lifting is desired, process with black powder and then lift.

INTERPRETATION OF RESULTS

Powder developed latent impressions which may be of value for individualization must be properly preserved. Experiments have revealed that the developed latent impressions have a weaker adhesion to the surface than undeveloped, and, as a result, are more susceptible to damage from accidental contact. Two methods of preservation are normally afforded the powder developed latent: photography and lifting.

Photographic preservation of developed impressions which may be of value for individualization is essential and must be accomplished as soon as possible. Lifting is also an approved procedure but caution should be taken when lifting to insure that the lift will be successful. If the lift can not be made with confidence that it will be successful, the developed fiction ridge detail should be photographed prior to lifting.

REFERENCES

1. Cowger, James F. *Friction Ridge Skin Comparison and Identification of Fingerprints*; Boca Raton: CRC Press, 1993.
2. Lee, Henry C.; Gaensslen, R. E., eds. *Advances in Fingerprint Technology*; CRC Press LLC, Boca Raton, FL, 1994.
3. Olson, Robert. *Scott's Fingerprint Mechanics;* Charles C. Thomas Publisher: Springfield, IL, 1978.
4. Waldoch, Terry L. "The Flame Method of Soot Deposition for the Development of Latent Prints on Non-porous Surfaces"; *Journal of Forensic Identification*, 1993, 43, 5, 463-465.

5.4.4 Cyanoacrylate Ester Fuming

INTRODUCTION

Cyanoacrylate esters are the active ingredients in the super bond adhesives and are generally available according to the type of alcohols used in manufacturing. Most cyanoacrylates are methyl or ethyl esters. Regardless of type, the esters volatilize into long chain molecules with a positive electrical charge. In an atmosphere of relatively high humidity, the cyanoacrylate ester molecules are attracted to fingerprint residue and polymerize upon the deposit.

Properties of the polymer are dependent upon the type of cyanoacrylate ester used. Both ethyl and methyl esters produce a visible white coating. Ethyl ester polymers are softer and less durable while methyl ester polymers can usually only be removed with solvents. However, the durable, hard property of the methyl ester appears to inhibit dye applications.

Locktite and other brand name products contain a cyanoacrylate ethyl ester and have proven to be quite effective for fuming. Locktite 495 Super Bonder provides a liquid useful for heat acceleration techniques while Hard Evidence is a gel which reacts to exposure to air. Any product containing ethyl ester generally will be more effective when subsequent laser dye applications are indicated. Cyanoacrylate ester fuming is highly effective with nonporous items made of plastics or metal. It is superior to any other method for the processing of gun metal.

PREPARATIONS

No specific preparations are needed as the cyanoacrylate materials being used are commercially prepared.

INSTRUMENTATION

Cyanoacrylate Fuming Chambers, Atmospheric and Vacuum

MINIMUM STANDARDS & CONTROLS

The Standards and Controls for cyanoacrylate ester fuming procedure require the use of test impressions. Non-evidentiary items such as aluminum foil, film leaders, glass slides, or pieces of plastic bags are convenient substrates when deliberately deposited with a test impression and placed near the evidence. Processing should be terminated when test impressions have reached optimum development. However, all items should be watched carefully as faster or slower development may occur. Exposure of surfaces to a high concentration of fumes can result in overdevelopment which obscures impressions due to total surface polymerization. The batch number for cyanoacrylate ester will be established by the date opened, such as (060404). If additional bottles are opened on the same day, add an alpha character to the batch number (060404a, b, c, etc.). The batch number must be placed on the working container. Documentation of this process

will be entered in the Daily Reagent Verification Logbook by initialing adjacent to the test date and by recording the batch number. This test shall be performed for each chamber cycle. The shelf life is indeterminable and may be used as long as it remains in a semi-liquid state and has a positive reaction with the test strip.

Atmospheric Chamber

Volatilization of cyanoacrylate ester at normal room temperature is relatively slow but is a viable procedure for evidence processing. Vapors must be contained, and a tank or plastic enclosure is most often used. A ratio of two drops of adhesive for every gallon of capacity or volume with relatively high humidity is usually effective. Polymerization may be retarded or prevented by low humidity. The addition of a cup of lukewarm water usually will improve the fuming results. Development time will vary with the temperature, humidity and the substrate being processed.

Application of heat greatly accelerates volatilization. Metal blocks or a hot plate can serve as the heat source but caution must be used not to over heat to the point where cyanide vapors can be produced. An aluminum dish or shaped foil may be placed on the hot surface and the adhesive poured onto the aluminum. A cup of warm water is placed in the enclosure. Volatilization can be very rapid and development may be accomplished. Care must be taken to closely observe the process to insure that the item is not overdeveloped.

An alternative, which offers rapid development time with minimum health risk, is to use a light bulb as the heat source. A standard light receptacle is added to the processing tank with a wire loop support fashioned to hold a watch glass approximately 1 inch above the light bulb. The adhesive is dropped onto the watch glass. A cup of warm water is placed in the enclosure if additional humidity is needed. Once the container is covered tightly, the light is turned on. Rapid volatilization does not begin until the heat from the bulb penetrates the watch glass. Natural convection currents aid dispersal of the fumes and development is generally accomplished in about 15 minutes.

Vacuum Chamber

A vacuum chamber using humidity and cyanoacrylate vapors @37C is a highly sensitive system to develop fingerprints on the inside of polyethylene bags, hand guns, long guns, gas cans, etc. Vacuum chambers are particularly effective on evidence that has a soot or oil film on the surface. Incubating dry fingerprints prior to CA fuming enhances the ridge detail.

INTERPRETATION OF RESULTS

Photographic preservation of developed impressions which may be of value for individualization is essential and must be accomplished as soon as possible. Once the latent impressions are recorded, further processing sometimes reveals impressions in which polymerization was too indistinct for visual notice or did not occur. Powders and particulate developers are effective and often permit additional photographic and lifting

preservation. Small particle reagent will sometimes adhere to faint impressions when powders will not. Laser dye application is generally effective after powder, particulate, or SPR application as the liquid dye solution will normally wash away the particulate remnants. However, vinyl, rubber, oily guns, and hard plastics, especially those used in cash register drawers, may not be receptive to any powder.

REFERENCES

1. Lee, Henry C.; Gaensslen, R. E., eds. *Advances in Fingerprint Technology*; CRC Press LLC, Boca Raton, FL, 1994.
2. Lennard, Christopher J.; Pierre A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints"; *Journal of Forensic Identification*, September/October 1988, 38, 5, 197-210.
3. Lee, Henry C.; R. E. Gaensslen. "Cyanoacrylate Fuming"; *Identification News*, 1984, 34, 3, 8-14.

5.4.5 Dye Stains

INTRODUCTION

Dye staining was developed as a means of enhancing cyanoacrylate ester polymerized impressions. The dye stain is applied to a non-porous item that has been subjected to cyanoacrylate ester fumes. The dye stain is applied to the object and visually examined utilizing an alternate light source. The application of the dye stain enhances the latent developed with cyanoacrylate ester fumes to allow for visualization and photography. Each dye stain listed below will have different preparation steps and optimum viewing parameters.

Rhodamine 6G

Rhodamine 6G fluoresces between 450 nm – 540 nm.

The examiner can choose from two preparations of Rhodamine 6G solutions. The preparation chosen is primarily dependent on the reaction of the substrate to the solvent used. A 0.01% to 0.001% Rhodamine 6G in methanol or isopropanol, weight to volume, is productive for most surfaces with methanol being the preferred solvent. Working solutions of Rhodamine 6G should be prepared in small amounts. Weaker solutions are recommended from the degree of background fluorescence. Aerosol spraying or fuming with Rhodamine 6G has been attempted with no consistent improvement in results, and are not recommended. Aqueous Rhodamine 6G solutions should be used when methanol or other organic solvents will be destructive to the surface being treated. If distilled water is not available deionized water may be used. The LP Section does not currently employ this aqueous solution in processing procedures, but should be included in this manual should a situation arise when destruction of evidence is a possibility with the Methanol Formula.

Methanol Formula

- 4 grams of Rhodamine 6G
- 4 liters of methanol.

Combine the ingredients and continue to stir the solution until all of the powder is dissolved.

Aqueous Formula

- 4 grams of Rhodamine 6G
- 4 liter of distilled water.
- 3-6 drops of Synperonic N *(optional)* - Synperonic N is a surfactant which allows for a sheeting effect or more even covering of the item with the working solution.

Combine the ingredients and continue to stir the solution until all of the powder is dissolved.

INSTRUMENTATION
High Intensity Ultra Violet Light Source
Alternate Light Source

Rhodamine 6G: examine the evidence using 450 nm to 540 nm light and view with orange goggles or red goggles.
Other wavelengths of light and goggle combination may provide better contrast and visualization of the latent print. The examiner should capture the best print possible using the available light source and filters.

Proper safety precautions including avoiding skin exposure and proper eye protection with appropriate optical densities must be utilized when operating ultraviolet light sources, lasers or alternate light sources. Consult the appropriate user's manuals for the safe use and appropriate eye protection for the specific piece of equipment being utilized.

MINIMUM STANDARDS AND CONTROLS
Dye stains work by staining latent impressions developed with cyanoacrylate ester. Non-porous, non-evidentiary items are to be used on which a latent test print is deposited. This testing procedure must be performed for each working solution at the time the solution is made. Documentation of this process must be done in the form of a reagent log to include a lot number. If additional batches are made on the same day, add an alpha character to the lot number (#####a, b, c, etc.). The lot number must be placed on the original/working container. Documentation of this process must be included in the reagent logbook by placing the date and initials of the preparer (chemist) adjacent to the quantity made and by recording the lot number. The LP verifying analyst must initial by the preparer's documentation, indicating a positive reaction with a test material. This test shall also be performed for each day that the reagent is needed. Documentation of this process will be entered in the Daily Reagent Verification Logbook by the LP analyst initialing adjacent to the test date and by recording the batch number.

SHELF LIFE:
Rhodamine 6G stock solution is indefinite, working solution must not exceed six months

PROCEDURE OR ANALYSIS

All applications should be done in a fume hood.

Rhodamine 6G

1. Apply the solution to the item to be processed by immersion or squirt bottle.
2. Rinse the item with methanol and allow to dry.

3. Examine the item with the alternate light source at the appropriate wavelength, 450 nm – 540 nm, using the appropriate filters.

INTERPRETATION OF RESULTS

Photographic preservation of developed impressions which may be of value for individualization is essential and must be accomplished as soon as possible.

REFERENCES

1. Lennard, Christopher J.; Pierre A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints"; *Journal of Forensic Identification*, September/October 1988, 38, 5, 197-210.
2. McCarthy, Mary M. "Evaluation of Ardrox as a Luminescent Stain for Cyanoacrylate Processed Latent Impressions"; *Journal of Forensic Identification*, 1990, 40, 2, 75-80.
3. Murbarger, Melissa, Lisa Zaccagnini, Substitute for Freon-Ardrox Formula. Illinois State Police Internal Publication, 1997; "Latent Impressions"; *Journal of Forensic Identification*, 1990, 40, 2, 75-80.
4. Lennard, Christopher J.; Pierre A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints"; *Journal of Forensic Identification*, September/October 1988, 38, 5, 197-210.
5. Masters, Nancy E. "Rhodamine 6G: Taming the Beast"; *Journal of Forensic Identification*, September/October 1990, 40, 5, 265-270.
6. http://www.cbdiai.org/Reagents/by40.html
7. FBI Processing Guide for Developing Latent Print, 2000; http://onin.com/fp/fbi_2000_lp_guide.pdf
8. Menzel, E. Roland. "A Guide to Laser Latent Fingerprint Development Procedures"; *Identification News*, September 1983.

5.4.6 Blood Protein Enhancement

INTRODUCTION

Enhancement of impressions believed to be deposited in blood can be done through the application of a solution that results in a color change when in contact with alpha amino acids or proteins present in the blood. The suspected blood on the surface of the object should be dry prior to the processing with the selected solution. Application of a blood protein solution may prevent a serological exam of the evidence after staining. The type of surface and order for sequential processing is listed below in the Procedure or Analysis section for each stain.

NOTE: The Latent Print analyst should consult with a serologist or DNA analyst prior to application of a solution if there is reason to believe the reagent process could be detrimental to subsequent DNA testing and results.

PREPARATIONS

Ninhydrin

See Chemical Processing of Porous-Ninhydrin

Amido Black

Chemical Formula

1. Dissolve 1.0 gram of amido black (Naphthol blue black) in 50 milliliters of glacial acetic acid.
2. Add 450 milliliters of methanol and thoroughly mix.

Rinse Option #1 - Mix 50 milliliters of glacial acetic acid with 450 milliliters of methanol.
Rinse Option #2 - Mix 50 milliliters of glacial acetic acid with 950 milliliters of distilled water or deionized.

MINIMUM STANDARDS AND CONTROLS

Make a test impression on a non-porous, non-evidentiary item, by placing a small amount of blood (no human blood) on the item and allowing the blood to dry. Apply the selected solution to the item and if a blue-black stain observed, the solution is working properly. Documentation of this process must be done in the form of a reagent log to include a lot number. If additional batches are made on the same day, add an alpha character to the lot number (#####a, b, c, etc.). The lot number must be placed on the original/working container. Documentation of this process must be included in the reagent logbook by placing the date and initials of the preparer (chemist) adjacent to the quantity made and by recording the lot number. The LP verifying analyst must initial by the preparer's documentation, indicating a positive reaction with a test material. This test shall also be performed for each day that the reagent is needed. Documentation of this process will be entered in the Daily Reagent Verification Logbook by the LP analyst initialing adjacent to the test date and by recording the batch number.

Shelf life:
Ninhydrin must not exceed one year.
Amido Black is indefinite.

PROCEDURE OR ANALYSIS

Ninhydrin

Ninhydrin can be used on any surface but should primarily be used on porous items. Porous items can be processed with ninhydrin visualizing both blood proteins and other alpha amino acids.
See Chemical Processing of Porous-Ninhydrin

Amido Black

Amido black is a permanent procedure which can be used on porous or non-porous surfaces. Amido black can be applied after cyanoacrylate fuming in many cases (see McCarthy and Grieve, 1989).

All applications should be done in a fume hood.

1. Amido Black solution is applied to the item by immersing the item in the solution in a large tray, ensuring complete coverage of the area to be examined, or by using a squirt bottle.
    - The solution should be agitated before evidence application as well as during the immersion process.
2. Rinse with the selected solution followed by the second rinse solution of distilled or deionized water until the desired result is observed.

INTERPRETATION OF RESULTS

Ninhydrin

The blood impressions as well as other protein based impressions will be intensified and additional detail not previously visible may be revealed. Coloration is not permanent, and while some impressions have remained visible for years, others have faded in a matter of days. Photographic preservation of developed impressions which may be of value for individualization is essential and must be accomplished as soon as possible.

Amido Black

The blood impressions will be intensified and additional detail not previously visible may be revealed. Photographic preservation of developed impressions which may be of value for individualization is essential and must be accomplished as soon as possible. Dried impressions which lose contrast may be re-immersed in the second rinse solution and re-photographed

REFERENCES

1. Cowger, James F. *Friction Ridge Skin Comparison and Identification of Fingerprints*; Boca Raton: CRC Press, 1993.

2. Lee, Henry C.; Gaensslen, R. E., eds. *Advances in Fingerprint Technology*; CRC Press LLC, Boca Raton, FL, 1994.
3. Lennard, Christopher J.; Pierre A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints"; *Journal of Forensic Identification*, September/October 1988, 38, 5, 197-210.
4. Olson, Robert. *Scott's Fingerprint Mechanics*; Charles C. Thomas Publisher: Springfield, IL, 1978.
5. McCarthy, Mary M.; David L. Grieve. "Preprocessing with Cyanoacrylate Ester Fuming for Fingerprint Impressions in Blood"; *Journal of Forensic Identification*, 1989, 39, 1, 23-32.
6. FBI Processing Guide for Developing Latent Print, 2000; http://onin.com/fp/fbi_2000_lp_guide.pdf
7. Norkus, P.; Kevin Noppinger. "New Reagent for the Enhancement of Blood Prints"; *Identification News*, 1986, 26, 4, 5 & 15.

5.4.7 Gentian Violet

INTRODUCTION

Gentian violet (crystal violet) is a sensitive stain which reacts with epithelial cells and other portions of latent print residue transferred upon surface contact. The presence of sebum appears to serve as an excellent transfer medium for sloughed epidermal cells and as a result, gentian violet is usually effective on surfaces which readily hold the deposited sebum, such as the adhesive side of tapes. The high sensitivity of gentian violet produces an immediate reaction upon skin contact; therefore, leak proof gloves are required for examinations. Accidental staining of hands is relatively harmless but usually cannot be de-stained. Disappearance of discoloration is a result of cell sloughing.

PREPARATIONS

Gentian violet working solution - 0.1% concentration preferred**.**
Higher concentrations are sometimes used, but increased amounts of gentian violet are difficult to dissolve and can create an increased background discoloration**.**
1. If distilled water is not available deionized water may be used.
2. Dissolve 1.0 grams of gentian violet in one liter of distilled water.

MINIMUM STANDARDS & CONTROLS

Dye stains, such as Gentian Violet, work by discoloring latent impressions composed of epithelial cells and sebum. Non-porous, non-evidentiary items (tape) are to be used on which a latent test print is deposited. This testing procedure must be performed for each working solution at the time the solution is made. Documentation of this process must be done in the form of a reagent log to include a lot number. If additional batches are made on the same day, add an alpha character to the lot number (#####a, b, c, etc.). The lot number must be placed on the original/working container. Documentation of this process must be included in the reagent logbook by placing the date and initials of the preparer (chemist) adjacent to the quantity made and by recording the lot number. The LP verifying analyst must initial by the preparer's documentation, indicating a positive reaction with a test material. This test shall also be performed for each day that the reagent is needed. Documentation of this process will be entered in the Daily Reagent Verification Logbook by the LP analyst initialing adjacent to the test date and by recording the batch number. Shelf life is indefinite.

PROCEDURE OR ANALYSIS

1. Immerse item to be processed in the working solution in a large tray.
2. Allow the item to remain completely immersed for approximately 30 seconds while agitating.
3. Remove the item from the working solution and rinse excess stain from the item by washing with a gentle flow of cold tap water.
4. This process may be repeated until optimum contrast is reached between the impressions developed and the background.

INTERPRETATION OF RESULTS

Photographic preservation of developed impressions which may be of value for individualization is essential and must be accomplished as soon as possible. Stained impressions which fade as the tape dries may be improved by immersing the tape in a tray of clear water and photographing the impressions while the tape is submerged.

REFERENCES

1. Arima, T. "Development of Latent Fingerprints on Sticky Surfaces by Dye Staining or Fluorescent Brightening"; *Identification News*, February 1981.
2. Cowger, James F. *Friction Ridge Skin Comparison and Identification of Fingerprints*; Boca Raton: CRC Press, 1993.

5.4.8 Sticky Side Tape Powder Technique

INTRODUCTION

The use of powder suspensions to develop impressions on the sticky side of tape has proven to be an effective alternative to the gentian violet technique. The use of powder suspensions to maximize contrast is the preferred technique on dark colored tapes lacking the availability of vacuum metal deposition. The consistent performance of powder suspensions on the adhesive side of tapes may, in the future, relegate the gentian violet technique to a secondary role when processing the adhesive side of tapes.

PREPARATION

1. Combine standard black powder or Redwop fluorescent powder with tap water at a ratio of 1:1.
2. Add transparent dishwashing liquid (Ivory® works best) to the solution and stir until the mixture is the consistency of a thick paste.

MINIMUM STANDARDS & CONTROLS

Powders work by adhering and causing staining of latent print residue. Non-evidentiary items (tape) are to be used on which a latent test print is deposited. This testing procedure must be performed for each working solution at the time the solution is made. This test shall be performed for each case and documentation of this process shall be included in the examiner's processing notes by indicating a positive reaction to the procedure. Shelf life is not an issue as only amounts needed for the particular evidence are mixed and then discarded.

PROCEDURE OR ANALYSIS

1. Immerse item to be processed in the working suspension or paint the mixture on the sticky side of the tape using a soft bristled brush.
2. Allow the suspension to remain on the item for approximately 10 seconds.
3. Remove the item from the suspension and rinse excess suspension from the item by washing with a gentle flow of cold tap water.
4. This process may be repeated until optimum contrast is reached between the impressions developed and the background.

INTERPRETATION OF RESULTS

This technique has been shown to be very productive and stable. Photographic preservation of developed impressions which may be of value for individualization is essential and must be accomplished as soon as possible.

REFERENCES

1. Gray, M. Leanne. "Sticky-side Powder Versus Gentian Violet: The Search for the Superior Method for Processing the Sticky Side of Adhesive Tape"; *Journal of Forensic Identification*, 1996, 46, 3, 268-272.
2. Kimble, Gary W. "Powder Suspension Processing"; *Journal of Forensic Identification*, 1996, 46, 3, 273- 280.

5.4.9 Gun Blueing Technique with Cartridge Casings

INTRODUCTION

Although many gun blueing formulations exist today, they essentially all work in a similar fashion. In short, blueing involves inducing an artificial rusting process using a specifically prepared oxidizing solution containing primarily seleneous acid and copper sulfate. These two compounds are responsible for the final blue / black color. While the metal is in contact with the solution, copper and selenium are removed from the solution and deposited together on the surface of the metal, most likely as the alloy copper selenide (CuSe). The presence of any fingerprint residue on the metal surface inhibits the deposition of the dark colored alloy. The resulting fingerprint detail appears light against a dark colored metallic background.

PREPARATION

Combine Perma Blue® Liquid Gun Blue with tap water at a ratio of 1:1.

MINIMUM STANDARDS & CONTROLS

Non-evidentiary items (cartridge casings) are to be used on which a latent test print is deposited. This testing procedure must be performed for each working solution at the time the solution is made. Documentation of this process must be done in the form of a reagent log to include a lot number. If additional batches are made on the same day, add an alpha character to the lot number (#####a, b, c, etc.). The lot number must be placed on the original/working container. Documentation of this process must be included in the reagent logbook by placing the date and initials of the preparer (LP analyst) adjacent to the quantity made and by recording the lot number. The LP verifying analyst must initial by the preparer's documentation, indicating a positive reaction with a test material. This test shall also be performed for each day that the reagent is needed. Documentation of this process will be entered in the Daily Reagent Verification Logbook by the LP analyst initialing adjacent to the test date and by recording the batch number. Documentation of this process shall be included in the examiner's processing notes by indicating a positive reaction to the procedure.

SHELF LIFE

Indefinite

PROCEDURE OR ANALYSIS

1. Immerse the body of the casing to be processed in the working solution.
2. Agitate the casing in the solution for approximately 10-15 seconds while monitoring the oxidation process to prevent overdevelopment.
3. Remove the casing from the solution and stop the oxidation process by dipping the treated casing in a beaker of tap water.
4. This process may be repeated until optimum contrast is reached between the impressions developed and the background.

INTERPRETATION OF RESULTS

This technique has been shown to be very productive and stable. Photographic preservation of developed impressions which may be of value for individualization is essential and must be accomplished as soon as possible.

REFERENCES

1. Leben, D. A. (1997, January-March). Evaluation of Gun Blueing Solutions and Their Ability to Develop Latent Fingerprints on Cartridge Casings. *FDIAI NEWS*, 10-11.

5.4.10 Postmortem Recording of Friction Ridge Skin

INTRODUCTION

The two primary reasons for recording prints of a deceased person are for individualization or for elimination purposes in a criminal investigation. These procedures are intended for use by latent print examiners who have received hands-on training in processing unknown deceased cases. Requests for post mortem recording will occur when efforts to obtain usable fingerprints have failed due to extensive damage or advanced decomposition. In the event of decomposition, the best results are generally achieved in the laboratory examining the hands/fingers severed from the deceased. The procedures described in this section shall deal with the premise of submitted severed hands/fingers, although adaptation to a morgue visitation is easily accomplished. This action does not signify these procedures to be mandated to the extent that it precludes the use of variations of the procedures or different procedures for recording prints from human remains.

Medical Examiner requests for identification of deceased will be handled as evidence. Postmortem prints and/or appendages will be transferred to the examiner prior to assessment and returned to the appropriate evidence storage location after testing procedures are concluded. The obtained recorded finger/palm/foot impressions will be returned to the Medical Examiner Office personnel.

SCOPE

These procedures are provided to assist in the recording of friction ridge impressions from deceased individuals. Friction ridge impressions obtained from unknown deceased individuals may be compared with known exemplars and/or searched in the Automated Fingerprint Identification System (AFIS) and the Integrated Automated Fingerprint Identification System (IAFIS) for the purpose of individualizations or exclusions.

EQUIPMENT/MATERIALS/REAGENTS

- Acetate
- Acetone (reagent grade)
- Alcohol (reagent grade)
- Aprons (disposable)
- Bleach
- Camera (or digital camera)
- Capped containers
- Casting material
- Cotton swabs
- Face shields
- Fingerprint brush (small, short bristled)
- Fingerprint cards
- Fingerprint ink

Fingerprint powders
Fingerprint spoon
Fingerprint strips
Glasses (safety)
Gloves
Goggles (safety)
Handi-print or rubber lifts (white)
Heat lamp
Hot plate (or equivalent)
AFIS/IAFIS equipment
Inking pad
Inking roller
Lab coats (disposable)
Laminate
Lifting tape (transparent)
Masks
Paper towels or other absorbent material
Plastic envelopes
Preservative (such as Metaflow or equivalent)
Rib cutters
Scalpels
Soap
Softener (such as Restorative or equivalent)
Transparency of fingerprint card

MINIMUM STANDARDS AND CONTROLS

The minimum standards and controls for the recording of postmortem prints requires the inspection of each area recorded to determine if the detail present is a clear and accurate depiction of the area that is being recorded.

PROCEDURE

Recording Prints to Confirm Identity

Individuals with a suspected identity and for which inked standards are available require only a recording of sufficient friction ridge skin area to confirm an individualization.

Recording Prints of Unknown Decedents

Those whose identity is unknown require a full recording or as many as possible/available of the fingers and palms.

Recording Prints for Elimination Purposes

If inked prints are being recorded for elimination purposes in a criminal investigation, major case prints will be obtained.

Proper Recording of Inked Prints

Fingerprint ink is applied to the finger using a direct roller application or using a detached glass plate previously coated with ink. If the glass plate is utilized, it is moved around the finger to insure even application. The recording is made by using a specially designed spatula or spoon with finger block strips or a standard fingerprint card specifically folded for postmortem printing. The spoon device, available from most fingerprint supply firms, is a curved instrument with slot-type guides to hold a strip of white card stock in place. Once the finger is inked, the spoon is pressed up against the finger. Usually the concave surface of the spoon affords ample contact between the strip and the digit to record the area of a normal rolled print with minimum movement. An alternate method simply uses a folded fingerprint card which is rolled around the deceased's inked finger. The recorder uses his or her hand to support and guide the card from the back (This is also applicable to recording inked palm prints). Either method requires care and patience to produce a full legible impression from each digit.

ACCEPTANCE OF HUMAN REMAINS

All human remains should be treated as infectious material and standard precautions should be exercised. Upon acceptance, the examiner should ensure that biohazard labels are on the containers.

STORAGE OF HUMAN REMAINS

Human remains must be stored in a secure biohazard refrigerator until appropriate friction ridges are obtained. It is the responsibility of the examiner to ensure that the integrity of human remains is maintained.

PREPARATION AND RECORDING TECHNIQUES

The examiner will process one finger or body part at a time and exercise all appropriate safety precautions.

Printing of palms/feet is dependent upon the attachment of identifiable fingers/toes and/or the availability of known prints, or as dictated by the circumstances.

The following procedures will be followed:

- If known prints are available for comparison, record as few impressions as necessary, from the intact remains and attempt to individualize.
- All fingers must be printed if the fingers are not attached to the hand.

HUMAN REMAINS IN GOOD CONDITION

The following procedures should be followed:

- Examine human remains visually to determine the appropriate methods of obtaining prints.
- Ensure the accuracy of the finger sequence to facilitate printing.

- If fingers are received detached, place each finger in an appropriately labeled container (one through ten to correspond with the finger number, Item number, Laboratory number and examiner's initials).
- If the hand is received intact and the recording process requires the fingers to be detached, use rib cutters to remove the fingers and place each finger in a separately labeled container labeled with the Item number, Laboratory number and examiner's initials.
- Gently clean the remains using a brush and warm water.
- Air dry the friction ridges or blot with paper towels before attempting to print.
- Use the appropriate printing method. Powder the finger and roll the powdered finger on a piece of lifting tape and place on a clean piece of acetate; or, apply ink to the finger and roll the inked finger on a fingerprint card. A fingerprint spoon may be used to facilitate recording.

DESICCATED HUMAN REMAINS

If the skin has become hardened or wrinkled, the following procedures may be followed:

- Soak the remains in plain or soapy warm water or in a solution comprised of 50% softener (Restorative or equivalent) and 50% preservative (Metaflow or equivalent). Removing the skin from the finger may facilitate the softening of the skin for printing.
- A method to remove wrinkles and restore the remains to the approximate natural size and shape is to inject the friction ridge skin with tissue builder using a disposable syringe.
- Air dry the friction ridges or blot with paper towels before attempting to print.
- Use the appropriate printing method. Powder the finger and roll the powdered finger on a piece of lifting tape and place on a clean piece of acetate; or, apply ink to the finger and roll the inked finger on a fingerprint card. A fingerprint spoon may be used to facilitate recording.

Alternative Recording Methods

  - Use a casting material (Mikrosil or equivalent) to record the friction ridge skin.
    - Following manufacturer's recommendations for application of casting material
  - Photograph the friction skin ridge detail.

Macerated Human Remains

Maceration may cause swelling and broadening of the friction ridges, therefore, automated searches may be adversely affected. Maceration may also cause the separation of the epidermis from the dermis. This separation of the two levels is sometimes referred to as "gloving". If the dermis level is being printed, the friction ridge path on the fingers or hands will appear as double rows of dermal papillae.

The following procedures should be followed:

- Gently clean the remains using a brush and warm water.
- Place the finger in a microwave-safe container and cover with water.
- Microwave on high for 15 seconds and peel off the skin.
- Dry the friction ridges before attempting to print. Air dry or blot the friction ridges with paper towels or dry with alcohol or acetone.
- If the skin is intact use tissue builder. If necessary, use a curling iron, a heat lamp, or other heat generating devices to dry the skin before attempting to record prints.
- Use the appropriate printing method. Powder the finger and roll the powdered finger on a Handi-print lift and place on a clean piece of acetate; or, apply ink to the finger and roll the inked finger on a fingerprint card. A fingerprint spoon may be used to facilitate recording.

Alternative Printing Methods for Gloved Skin

- Slip the skin over the examiner's gloved finger and roll the finger in ink or powder the finger and then roll onto the appropriate card or acetate.
- Use a casting material (Mikrosil or equivalent) to record friction ridge skin detail.
- Photograph the friction skin ridge detail.
- If printing the underneath side of the epidermis, the print will be in the reverse position.

Burned or Charred Human Remains

A thorough examination is necessary to determine if the friction ridge skin is intact and can be recorded. Clenching of hands may preserve friction ridge detail.

The following procedures should be followed:

- Use care to avoid destroying friction ridge skin.
- Remove hardened or partially loose skin by gently twisting.
- Examine underside of the skin for ridge detail.
- Gently clean the remains using a brush and warm water.
- Photograph the friction skin ridge detail.
- Dry the friction ridges before attempting to print.
- Air dry or blot the friction ridges with paper towels or dry with alcohol or acetone.
- Use the appropriate printing method. Powder the finger and roll the powdered finger on a piece of lifting tape and place on a clean piece of acetate; or, apply ink to the finger and roll the inked finger on a fingerprint card. A fingerprint spoon may be used to facilitate recording.

- If the friction ridge skin has been destroyed by burning, note on the fingerprint card.

Human Remains in a State of Rigor

If the fingers are stiff or rigid, the following procedures should be followed:

- Make a deep cut at the joint with a scalpel to straighten.
- Breaking the finger may destroy friction ridge skin.
- Photograph the friction skin ridge detail.
- Use appropriate printing method. Powder the finger and roll the powdered finger on a Handi-print lift and place on a clean piece of acetate; or, apply ink to the finger and roll the inked finger on a fingerprint card. A fingerprint spoon may be used to facilitate recording.

Epidermal Layer Not Present and the Dermal Layer Ridges are Depressed

This condition is possibly caused by moisture loss, but not to the point of being desiccated. Heat and rehydration often have the effect of elevating the existing ridge detail.

The following procedures should be followed:

- If necessary, detach the finger.
  - Verbal permission from the attending Medical Examiner will be required prior to this procedure
- Dry the friction ridges before attempting to print.
- Lightly brush the friction ridges with black fingerprint powder.
- Roll the powdered finger on a piece of lifting tape and place on a clean piece of acetate.
- Boiling method
- Photography

INTERPRETATION OF RESULTS

The wide possible conditions affecting postmortem recording precludes predictable results of any method, but with care and patience, adequate friction ridge detail is usually obtainable. Laboratory examination with access to materials and equipment, including proper photography, generally produces satisfactory results when attempts at the morgue are not successful.

INFORMATION TO BE PLACED ON CARDS BEARING PRINTS

- Descriptive data
- Missing fingers noted
- Examiner's signature/initials
- Pertinent information
- Medical Examiner’s Case Number
- Laboratory Number

- Item Number

SEARCHING UNIDENTIFIED PRINTS

Conduct an automated fingerprint and/or palm print search (es) in the AFIS/IAFIS databases.

CASE FILE DOCUMENTATION

All case-related work must be documented and retained in the case file. Comparison quality copies (photographed, digitally captured and recorded to CD/DVD or photocopied) must be retained. The original prints shall be returned to the appropriate storage location (Evidence Receiving Section if obtained from the morgue or the Medical Examiner's Office if obtained from record files).

DISPOSITION OF HUMAN REMAINS

The following procedures must be followed:

- Ensure biohazard labels are on evidence container(s).
- Ensure that the remains are in leak proof primary and secondary containers.
- Return remains to the morgue for disposal.

LIMITATIONS

Gloved skin is larger than attached skin; therefore, AFIS/IAFIS searches may be adversely affected. Charred skin is smaller than attached skin; therefore, AFIS/IAFIS searches may be adversely affected.

SAFETY

The following Standard Precautions should be followed:

- Use barrier protection at all times (gloves, masks, eye wear, and disposable lab coat/apron).
- Use double gloves when there may be hand contact with blood or other potentially infectious materials.
- Change gloves if torn, punctured or otherwise compromised.
- Wear goggles, glasses with side shields, or full face shields to protect from splashes, sprays, spatters, droplets of blood, or other potentially infectious materials.
- Always use a disposable lab coat and/or apron for splash protection.
- Wash hands after removal of gloves or other personal protective equipment.
- Place contaminated sharps in appropriate puncture-resistant container.
- Reduce the use and handling of sharp instruments as much as possible.
- Avoid bending, removing, or otherwise handling contaminated sharps.
- Minimize spills and spatters.
- Decontaminate all surfaces and devices after use (10% bleach solution or alcohol).
- Wash surfaces and devices with water after decontamination.
- Use biohazard labels as required.

- Use leak proof primary and secondary containers during collection, handling, processing, storage, transport, or shipping of biohazard material (human remains).
- Dispose of infectious waste in a biohazard bag.
- Maintain biohazard bag in a rigid container.
- Refer to Department Safety Manual, Exposure Control Plan for additional information.
- Refer questions regarding the disposal of chemicals used to process deceased cases to the Latent Print Section Supervisor or the Laboratory Safety Officer.

REFERENCES

1. F.B.I., *The Science of Fingerprints*
2. Olson, Robert, *Scott's Fingerprint Mechanics*, Charles C. Thomas Publisher: Springfield, IL, 1978.
3. Cowger, J.F., Taking Inked Prints, *Friction Ridge Skin, Comparison and Identification of Fingerprints*, CRC Press, Boca Raton, Florida, 1993, pages 9-33.

5.4.11 Friction Ridge Print Examination

INTRODUCTION

Friction ridge print examinations are conducted using the Analysis, Comparison, Evaluation and Verification (ACE-V) methodology, utilizing both qualitative and quantitative analysis. This process is applied regardless of the combination of print types (i.e., unknown versus known, known versus known, or unknown versus unknown).

Every latent captured for analysis, photographed or lifted, shall be designated a number regardless if it is of value for identification. The designated number shall be a combination of the Item # and a sequential number.

Examples:

- E-1 / L1 indicates one latent print was captured on Item E-1 / L1

- E-9 / L1, E-9 / L2, E-9 / L3 indicate three latent prints were captured from Item E-9.

The examination documentation shall include the value (results of the analysis) of all designated latent prints and the results of all comparison.

Examination documentation must acknowledge the existence of prints of "no value" and also acknowledge the existence and disposition of any captured latent prints which are not analyzed, compared or evaluated.

Consultations between examiners shall be documented and include the specific friction ridge impression(s) reviewed, the nature and results of the consultation. The initials and date of the consultation will appear in the associated examination documentation. Consultation is a significant interaction between examiners regarding one or more impressions in question.

ANALYSIS

Analysis includes the assessment of a friction ridge print to determine its "value" by analyzing level one, level two, and, if present, level three detail, in addition to any other relevant information such as substrate, transfer medium, development method, deposition and lateral pressures, and anatomical orientation. The determination "of value" by the examiner indicates that sufficient reliable details are present in the print such that, when compared to another print, a conclusion of individualization, can be reached. If the print lacks sufficient reliable details to reach a conclusion of individualization, the print is determined to be of "no value." Distortion is not a discrepancy and is not a basis for exclusion. The analysis is conducted prior to and regardless of whether comparisons will be conducted. The following factors affect the qualitative and quantitative aspects of friction ridge impressions.

1. Examine the print using appropriate software, a magnifier or microscope, when necessary
2. Determine if the print is of friction ridge skin
3. Analyze the print using the following information when available:

- Substrate (porous, non-porous, semi-porous, smooth, rough, corrugated, pliable, textured)
- Transfer medium (sweat, blood, paint, dirt, oil, grease, etc.)
- Development method (illumination techniques; physical, chemical processing)

- Transfer conditions (deposition pressure, slippage or twisting, sequence (double-taps or overlays); lateral pressure
- Preservation method (photography, lifting, live-scan, and ink)
- Anatomical aspects of the skin, to include orientation, condition (warts, scars, etc.), morphology of the hand or foot relative to the shape and contour of the substrate

- **Level one detail**
    - Overall ridge flow
    - General morphology (e.g., presence of incipient ridges, overall size)
    - Can be used for pattern interpretation
    - Can be used to determine anatomical source (i.e., finger, palm, foot, toe) and orientation
    - Cannot be used to individualize

- **Level two detail**
    - Individual ridge path
        - Presence of ridge path deviation (e.g., ridge ending, bifurcation and dot)
        - Absence of ridge path deviation (e.g., continuous ridge)
        - Ridge path morphology (e.g., size and shape)

    - Used in conjunction with level one detail to individualize
    - Used in conjunction with level one detail to exclude

- Level three detail
    - Structure of individual ridges
        - Shape of the ridge
        - Relative pore position
    - Other specific friction skin morphology (i.e., secondary creases, ridge breaks, etc.)
    - Used in conjunction with level one and level two detail to individualize
    - Used in conjunction with level one and level two to exclude

- Other occasional features associated with friction ridge skin (e.g., creases, scars, warts, paper cuts, blisters)
    - May be permanent or temporary
    - May exist as level one, two and three detail

- May be used in conjunction with friction ridge detail to individualize or exclude

Determine if sufficient reliable details are present in the print such that, when compared to another print, a conclusion of individualization can be reached.

It is recommended to orient the print in the correct anatomical position and document on the photograph as follows:

- Fingerprint - Draw a horseshoe-shaped mark over the top of the print
- Palm print - Draw a line at the bottom of the palm print
- Impression - Draw a circle around the print indicating that its anatomical source cannot be determined
- Toe print - Draw a horseshoe-shaped mark over the top of the print with the notation "toe"
- Foot print - Draw a line at the bottom of the foot print with the notation "foot print"

Required for marginal prints: Document level two detail, as part of the Analysis, in order to determine if "of value" and prior to conducting a comparison. Documentation of any other factors affecting examinations is acceptable.

Documentation can be accomplished by one of the following methods:

- Marking on the photograph with a dissecting needle, ridge counter or fine tip permanent marker.
- Annotating the electronic version of the digital image with appropriate software tools, saving the annotated image to the case record and printing the image for the case record.

Intentionally recorded known prints require a determination of suitability for comparison.

Conduct an analysis of the known exemplar, documentation of the level two detail is not necessary.

COMPARISON

Comparison is the direct or side-by-side observation of friction ridge detail to determine whether the information in two prints is in agreement based upon similarity, sequence, and spatial relationship.

If the analysis phase determines the probable finger, proceed to a comparison with the appropriate digit.

If the analysis phase determines the correct hand but not the probable finger, proceed to a comparison of all the fingers on the appropriate hand (i.e., analysis indicates right hand, begin with finger number one through number five).

If the analysis phase does not determine the finger or hand, then proceed to a comparison of all the fingers.

If the analysis phase determines the print in question to be a palm print from a particular hand, proceed to a comparison of the appropriate palm print.

If the analysis phase does not determine the print in question to be a palm print from a particular hand, proceed to a comparison of both palms.

If the analysis phase does not determine the correct finger or hand, proceed to a comparison of all the fingers and palm prints. After initial comparison, rotate the unknown print until all possibilities have been compared.

EVALUATION

The third step of the ACE-V method wherein an examiner assesses the value of the details observed during the analysis and the comparison steps and reaches a conclusion.

Conclusions that can be reached:

- Individualization
- Exclusion
- Inconclusive

(Also see section 5.10 of this manual)

Individualization

- Individualization is the conclusion reached when an examiner determines two friction ridge prints are in agreement and that the friction ridge prints originated from the same source.
- When all level one, level two, and, if present, level three detail are in agreement, without any unexplainable discrepancies, then an individualization has been determined.

Exclusion

- The determination by an examiner that there is sufficient quality and quantity of detail in disagreement to conclude that two areas of friction ridge impressions did not originate from the same source.

- An exclusion decision can be based solely on Level 1 when sufficient pattern area and orientation indicators (e.g., recurves, cores, deltas and creases) are available and when disagreement has been observed absent any significant distortion such as: double tap, overlaid impressions or twisting. If significant distortion is observed, an exclusion decision can only be reached by considering both Level 1 and Level 2 details.
- An exclusion decision can be based on Level 2 detail when sufficient disagreement has been observed.
- Level 3 details cannot be the sole factor in exclusion decision. Level 3 details have to be considered in conjunction with Level 1 and Level 2 details.

Inconclusive

- An inconclusive decision occurs when an examiner is unable to individualize or exclude the source of a print because the corresponding areas of friction ridge detail are absent or unreliable. For example, if the print to be compared is from the tip or lower joint of a finger and the corresponding area is not captured on the known card or the corresponding area is unusable due to distortion, then an inconclusive decision would be reached.
- Appropriate additional known exemplars indicating specific friction ridge areas needed in order to conclusively render an opinion will be addressed in the report.
- Inconclusive evaluation results must not be construed as a statement of probability. Probable, possible or likely individualization (identification) conclusions are outside the acceptable limits of the friction ridge identification science.

VERIFICATION

Verification is the independent application of the Analysis, Comparison and Evaluation methodology to a friction ridge print by another examiner. All individualizations and exclusions must be verified by another latent print examiner who has been authorized to do casework.

A "Verification" will be subjected to the verification process with the results known to the verifying examiner.

Differences in opinions regarding verifications shall be referred to the Latent Print Section Chief. Please see the Conflict Resolution policy in Section 4.13 of this manual.

Verifications must be completed prior to communicating the information to the contributor, either verbally or in writing.

The verification should not be conducted by an examiner that has been solicited for consultation regarding opinions/conclusions and the technical reviewer, if possible, should not be the Verifying Examiner.

Also see Section 4.13 of this manual.

REFERENCES

1. SWGFAST, Scientific Working Group on Friction Ridge Analysis Approved Guidelines & Friction Ridge Examination Methodology for Latent Print Examiners
2. SWGFAST, Standards for Examining Friction Ridge Impressions.

5.4.12 Automated Fingerprint Identification System (AFIS)

INTRODUCTION

Automated Fingerprint Identification System (AFIS) is a laboratory instrument that can be used to perform searches of the Arkansas state database of known finger and palm prints. The system is housed and maintained by the Arkansas State Police (ASP).

Integrated Automated Fingerprint Identification System (IAFIS) is another AFIS system used to perform searches, utilizing the Universal Latent Workstation (ULW) software, of the FBI's known fingerprints only; palm print capabilities are not available at this time. The system is housed and maintained by the FBI. The ULW software and updates are provided by the FBI.

PROCEDURES

All latent prints (fingers and palms) that are of AFIS quality and have not been manually individualized with known fingerprints should be searched in AFIS. Determination of which prints are AFIS quality is conducted by the examiner. The examiner should consider several factors when determining which prints should be searched such as: type of evidence; the quality and quantity of minutiae detail; AFIS/IAFIS limitations. Latent prints such as lower joints or the extreme sides of the fingers are examples of what may not be suitable for entry into AFIS/IAFIS. It should be noted that while in the Arkansas AFIS system, searching of extreme tips may not yield consistently high percentages of hits; however, the IAFIS system may be more effective. The AFIS system captures minutiae beginning in the core of the finger and works toward the outside edges of the finger until the maximum number of minutiae for that finger are captured. The IAFIS system begins at the tip of the finger and works toward the baseline of the finger capturing minutiae; therefore, consistently recording the tips of the fingers, if recorded.

No individualizations will be made by solely viewing the prints on the monitor; a hard copy of the known prints must be utilized for this purpose and the subsequent verification.

The examiner is encouraged to initiate latent print searches using the probable fingers and appropriate areas of the palms and to limit the search to the probable finger/palm.

The following minimal information resulting from AFIS entries will be retained as examination documentation for each latent print searched.

- Printouts of the entire candidate list, usually twenty (20) candidates (AFIS) and twenty (20) candidates (IAFIS), respectively.

5.4.13 Solemate® (Footwear Search Program)

INTRODUCTION

The Solemate® footwear reference database is designed to assist examiners in the Latent Print Division search a questioned impression for a possible manufacturer design of a specific shoe.

PROCEDURE

Choose "Coding" from tab options on right side of SICAR screen.

Click the "+" button in the top search box to load the outsole element coding options. The "Add SHAPE Coding Step" box will appear.

Clicking on the entries in the "Shoe Icons" list will populate the right-side box accordingly. Highlight pertinent coding options and click "Add Step." This will add the coding choice to the master search list.

The shoe outsole diagram in lower left of box allows for choosing coding options for the various portions of the outsole, including the border, center, instep, toe and heel. Clicking on the shoe region prior to clicking "Add Step" will segregate the coding option to only that portion of the outsole being searched.
When all coding options have been added, click "Close."

If a logo, or portion of a logo, is present within the impression, then the logo may also be searched. Click the "+" button in the middle search box. The "Add Logo Coding Step" box will appear.

Scroll through logo images. When the pertinent logo(s) is/are located, click to highlight and click "Add." Logos must be added one at a time.

Filters may be turned on/off while utilizing the Logo search function. To turn ON the logo filter, click the "Filter" button at the top left of the search box. A second Logo filter box will appear. Choose the pertinent options and "Include All" or "Exclude Any." To turn off any logo filters click the "No Filter" button at the top left of the search box.

Text coding is also available for search. If text is present within the impression to be searched, click on the "+" button in the lowest search box. Free-form text may be entered in the available text box. Click "Add" or "Definite" to add the text to the search criteria.

Ensure that "Reference Library" is populating the drop down menu.

Click "Search."

Search results will automatically populate the SICAR search screen when complete. The results box may be expanded for ease of viewing.

Manually scroll through search results.

Potential matches may be viewed in list form or as thumbprints only. Toggle back and forth between options by clicking the "View List or Images" button in the upper left of the respondent box.

The list may be expanded by clicking the green "Fetch More Results" button in the top left of the box.

When correct outsole is located, highlight the selection.

Click "File" and "Print Report."

Ensure that the report includes: Detail, Notes and Identity. Choose the printer and click print.

The printed report shall be included in the case record repository

5.5 Equipment

The Latent Print Section has adequate equipment to perform the necessary testing. The equipment is maintained by personnel of the latent print section who utilize it.

Before instrumentation/equipment is placed into service, a calibration or performance verification shall be performed to ensure that it meets the specifications required by the appropriate method and will be documented in the Latent Print Instrument / Equipment & Performance Verification and / or General Maintenance Logs.

Designated instrumentation/equipment will also be subject to a schedule of performance verifications or calibrations that will be recorded in the Latent Print Instrument / Equipment & Performance Verification and / or General Maintenance Logs, unless otherwise stated. Any adjustments to and maintenance of the instrument/ equipment will also be recorded in these logbooks.

If an instrumentation/equipment does not function to the performance standard, it will be taken out of service and either replaced or repaired prior to being placed back into service.

After significant maintenance has been performed, a calibration or performance verification shall be performed and recorded in the Latent Print Instrument / Equipment & Performance Verification and / or General Maintenance Logs.

MorphoTrak (Safran Group) Latent Stations

The Latent Print Section has three (3) MorphoTrak Latent Stations located in the AFIS room. The MorphoTrak Latent stations provide latent entry, image enhancement, editing and charting of latent prints, and search review capabilities. The operator can enter and encode minutiae on latent fingerprints and palm prints and initiate a comparison of a latent print to an existing tenprint, palm print or unsolved latent record file. Search results are reviewed onscreen. The AFIS Operational Readiness Verification (ORV) is a performance check and is run monthly by a Latent Print Examiner on each latent station. The AFIS ORV performance check will be carried out as follows:

To ensure that the AFIS system is working properly, a benchmark print in the same format as the latent print (e.g., 1X (normal) and/or 5X (traced)) should be run on a monthly basis. The benchmark print will be captured (direct read) and searched in a 1X and/or 5X format, without editing. However, the finger number and pattern type will be utilized as part of the search criteria. After verifying that the respondent list contains the source of the known test impression, the "Match Report" is printed and maintained

in the AFIS ORV logbook located in the AFIS room for the assessment cycle. The result is logged, initialed and dated for each workstation on LP-Form-26.

If the known candidate is not on the candidate list, an additional search will be initiated. If the known candidate does not appear on the second candidate list, a service call will be made to the AFIS Help Desk. The terminal will also be marked as being "Out of Service" to include the date. This will be recorded in the Latent Print General Maintenance Log. Additionally, the AFIS entries made since the last positive control may need to be researched depending on the identified problem.

Air Science SafeFume™

The Latent Print Section has one (1) SafeFume™ cyanoacrylate fuming chamber located in the processing room. The automatic control system programs the fuming cycle and controls all functions start-to-finish. It establishes the proper fuming intensity and duration. The fuming time, humidity, and chamber fume evacuation can be user-set. Performance verification is conducted on a daily basis if the fuming chamber is involved in a processing method for a given item or items of evidence. The Daily Reagent Verification Log located in the processing room contains the LP-Form-06 for recording results. The analyst conducting the performance verification will initial and date this form accordingly.

Forensic Light Sources

The Latent Print Section has two (2) forensic light sources; the Omnichrome Spectrum 9000+ located in the processing room, and the Omnichrome 1000, located at the digital imaging / processing station in the AFIS room. The Omnichrome Sprectrum 9000+ has tunable output covering the spectrum from the ultraviolet to the near-infrared (300 nm to 750 nm) and the ability to adjust both bandwidth and wavelength in 1-nm increments. The Omnichrome Omniprint™ 1000 has a tunable output ranging from an open setting with a UV filter to 570 nm.

The *Latent Print General Maintenance Log* is available for each alternate light source in use in the Latent Print Section. The alternate light source does not require regular performance verification.

Should an analyst encounter a problem with the alternate light source during use, the "Troubleshooting Checks" provided in Table 1 will assist the analyst in determining the problem so it may be corrected. Any maintenance resulting from a Troubleshooting Check will be recorded on the appropriate log sheet.

Table 1 *Alternate Light Source Troubleshooting Guide*	
Troubleshooting Checks	**Actions**
Is light bulb damaged?	If damaged, replace bulb, document in maintenance log
Is the wavelength set in a viewable range for the dye stain?	Adjust as necessary (450nm to 540nm for R6G) Also refer to Test Methods Section 5.4 of this manual
Are the correct barrier filters (goggles) being used?	Orange or red goggles are recommended for viewing of R6G Also refer to Test Methods Section 5.4 of this manual

If any of the above actions fail to correct the problem then the alternate light source must be removed from service for repair/replacement. After the alternate light source is repaired/replaced, the alternate light source should be checked to ensure proper functionality and wavelength. All repairs and maintenance must be documented on the *Latent Print General Maintenance Log.*

Sirchie All Purpose Fuming Cabinet and Heating Chamber

The Latent Print Section utilizes the Sirchie All Purpose Fuming Cabinet to assist the latent print examiner in the thermal treating (flash boiling) of appendages during the identification efforts of unknown deceased individuals.

The *Latent Print General Maintenance Log* is available for the Sirchie All Purpose Fuming Cabinet in use in the Latent Print Section. The Sirchie All Purpose Fuming Cabinet does not require regular performance verification.

Should an analyst encounter a problem with the all purpose fuming cabinet during use, the "Troubleshooting Checks" provided in Table 2 will assist the analyst in determining the problem so it may be corrected. Any maintenance resulting from a Troubleshooting Check will be recorded on the appropriate log sheet.

Table 2 *Sirchie All Purpose Fuming Cabinet and Heating Chamber Troubleshooting Guide*	
Troubleshooting Checks	**Actions**
Is heating element turned on?	Adjust the Thermostat switch to ON
Is the heating element set to reach a boiling temperature?	Adjust the Thermo Control to HI

If any of the above actions fail to correct the problem then the all purpose fuming cabinet must be removed from service for repair/replacement. After it has been repaired/replaced, the all-purpose fuming cabinet should be checked to ensure proper functionality. All repairs and maintenance must be documented on the *Latent Print General Maintenance Log.*

Equipment Training

New employees of the Latent Print Section shall be trained on the appropriate equipment during their designated training program. When new equipment requires a ZC0693LZ0S7H9S
1ZC0693LZ0S7H9S
validation, appropriate personnel will be trained, and this training will be documented and kept in each individual's Employee History Binder. Up-to-date instructions on the use and maintenance of the equipment shall be readily available for use.

Equipment Identification

All equipment and its software, if practicable, will be uniquely identified. The identifier will be marked on the instrument/ equipment (i.e. MorphoTrak Latent Station 1, 2, 3) and will be documented in the Latent Print Instrument / Equipment & Performance Verification and General Maintenance Logs.

Equipment Records

The Latent Print Instrument / Equipment & Performance Verification and General Maintenance Logs will be kept in the Latent Print AFIS room.

Handling and Maintenance of Equipment

All equipment will be maintained in a clean, orderly, and safe condition. The Latent Print Section equipment shall be handled responsibly to ensure optimal performance and to avoid contamination and premature wear and damage. It is the Latent Print Section Chief's responsibility to ensure that proper planning and care is taken when equipment is initially located or subsequently moved. Equipment that is infrequently used shall be stored (covered, powered-down, etc.) per the manufacturer's recommendations.

A performance verification shall be performed on instrumentation and equipment that has gone outside of the direct control of the laboratory (e.g., for repair or preventive maintenance) to ensure that its calibration status is satisfactory before being returned to service. The Latent Print Instrument / Equipment & Performance Verification and / or General Maintenance Logs will reflect that the equipment was functioning properly prior to being returned to service.

Equipment Out of Service

If equipment is not working properly or potential problems are observed, it is the duty of the analyst to immediately take the appropriate steps to repair/correct the problem or inform the appropriate individual of the problem. Any problem and the action to correct the problem must be logged in the Latent Print Instrument / Equipment & Performance Verification and / or General Maintenance Logs.

Equipment that is not working properly must be clearly marked as being 'OUT OF SERVICE' in order to prevent inadvertent use of the equipment. The equipment will not be used in casework until appropriate calibration or verification is performed.

When it has been determined that equipment was not working properly, the Section Chief shall take into consideration the effect the problem may have had on previous tests and if there is an issue of non-conforming work (see Section 4.9 of the ASCL Quality Manual (ASCL-DOC-01).).

5.6 Measure of Traceability

Instruments and equipment used for tests having a significant effect on the accuracy or validity of the result of the test shall be calibrated or performance verified before use in casework. See section 5.5 of this manual for calibration and performance verification procedures for the instruments and equipment of the Latent Print section.

Also please refer to ASCL Quality Manual (ASCL-DOC-01).

5.7 Sampling

See ASCL Quality Manual (ASCL-DOC-01).

5.8 Handling of Test Items

Evidence will be checked out from Evidence Receiving in accordance with evidence policies. Be aware of all the sections and testing that involves the evidence prior to examination. Take the necessary precautions to preserve the integrity of the evidence.

Responsibilities and Procedures

In order to determine the items most likely to assist in the investigation and to prioritize those items for examination, the examiner or analyst may conduct a review of large, bulky submissions. Whenever possible, this review will occur with the agency representative in person, by email or by phone to assist with the investigation and to eliminate unnecessary examinations or analyses.

The evidence will be returned to Evidence Receiving in a timely manner after completion.

Evidence and Packaging Documentation:

Description of evidence packaging and evidence will be documented on LP-FORM-17. Dual trained Physical Evidence/Latent Print Technicians may use LP-FORM-17 or SER-FORM-01 and/or SER-FORM-03.

Evidence Sealing

Evidence will be sealed in a manner in which the contents cannot readily escape and in such a manner that opening the container would result in obvious damage or alteration to the container or its tape seal. All evidence must bear a proper seal which shall include the initials or other identification of the person sealing the evidence across the seal.

When the container is opened, the original seal shall be left intact, whenever practical, and a new opening made. When the analysis or examination is completed, the new opening shall be sealed, as outlined in these procedures; thus the original container seals will be intact and all seals will be clearly marked.

If reusing the original container is impractical, a new evidence container may be used. It shall also be marked and sealed according to the above procedures and the original evidence packaging shall be kept inside the second evidence container. If the original packaging cannot be kept, there must be complete documentation along with a picture of original packaging retained in the case record. (Toxicology samples only need a written description of the packaging.) Documentation of the change in packaging along with description must be documented in the case record for future reference.

Test Item Identification

A unique case number is assigned to every case when evidence is initially received by ASCL. Each exterior container must have its unique barcode label affixed to it. Agency evidence numbers will be used to identify the evidence whenever practical.

If testing requires that uniquely identified items be subdivided within the laboratory, appropriate sub-item identifiers shall be assigned and the item(s) labeled by the analyst so that the sub-item may be easily tracked and identified as having originated from a particular item.

Suitability of Test Items

Evidence submitted to the laboratory must be properly packaged, labeled and sealed to prevent contamination, loss or deleterious change. If there is any packaging deficiency noted at the time of receipt, it must be corrected, preferably by the submitting customer. If the customer is not available or it is not expedient to call the customer back to correct the deficiency, an Evidence Technician may take steps to correct the problem (i.e. provide a remedial seal). However, if the deficiency is serious enough to bring into question the integrity or identity of the test item, the appropriate Section Chief and customer agency must be contacted to resolve the issue before the evidence is analyzed.

If a packaging deficiency is not apparent until the case is checked out by an analyst, the analyst may correct the deficiency. If there is any concern that the packaging deficiency has affected the integrity or identity of the test item, the Chief Latent Print Examiner and the customer agency shall be advised and consulted with for further instructions.

If the analyst discovers an inconsistency between the stated and actual contents of a package or the suitability of an evidence item for testing, the analyst shall make all attempts to contact the customer and document the discussion (e.g. *Agency Contact Form* (ASCL-FORM-06), email, etc.) prior to issuing a report. For minor inconsistencies, the analyst shall use their judgment on whether to contact the customer, but must make a note of the discrepancy in the case file.

All remedial actions taken to correct packaging or evidence deficiencies shall be noted in the case record (e.g. submission form or analyst's notes).

Safeguarding the Integrity of Evidence

Evidence in the Latent Print Section may be stored in secured individual offices of analysts and the powder and chemical processing rooms. Evidence must be kept in one of these locations for overnight storage. Evidence shall be maintained under appropriate conditions to prevent deterioration, loss or damage to the evidence during storage, handling or the testing process.

Medical Examiner requests for identification of deceased will be handled as evidence.

Postmortem prints and/or appendages will be transferred to the examiner prior to assessment and returned to the appropriate evidence storage location after testing procedures are concluded.

Collection of transfer DNA swabs from evidence items will be conducted as requested or as deemed necessary by the examiner.
- Wear gloves and a mask, if necessary, to prevent contamination of the evidence item.
After swabs have been obtained, evidence may be handled according to labwide personal protective equipment requirements (see ASCL Health and Safety Manual Appendix D).
- Clean the work area with 10% bleach solution.
Alternatively, the evidence item may be kept in its container, rather than placed on the countertop, during the swabbing process.
- Lay down clean paper.
- Lightly moisten a swab with distilled water.
- Swab surfaces of the evidence item that are likely to have DNA.
- Use as few swabs as possible to concentrate the DNA obtained.
- Dry the swabs, then package the swabs in an envelope.
In Justice Trax, itemize and de-containerize an envelope under the parent item to hold the swab envelopes. Then, individually itemize the swab envelopes under the evidence item and show their location as being in the de-containerized envelope.
-The swabs will be transferred to the Physical Evidence section for long term storage on a reasonable time basis.

Drug evidence will be separated prior to examination by the Latent Print Section, except under special circumstances.

Securing Evidence
All evidence not in the process of examination/analysis shall be maintained in a secured, limited-access storage area under proper seal. This will normally be the evidence storage area in Evidence Receiving, but the secured individual offices of analysts may also serve as a storage area for such evidence temporarily.

Unattended Evidence
Evidence in the process of examination may be left unattended for limited periods of time (e.g. lunch, short breaks, etc.) but must be in a secure limited access area. If the analyst needs to be away for a longer period of time, the evidence shall be secured in a short term storage location, whenever practical. If this is not possible, the analyst shall take reasonable precautions to protect the evidence from loss, cross-transfer, contamination and/or deleterious change.

Evidence shall not be left unattended if it is not in the process of being examined or there is no expectation of frequent examination.

Evidence in the Process of Examination

Items with an expectation of frequent analysis may be considered "evidence in the process of examination/analysis" and may be stored unsealed in a limited access area as long as the evidence is protected from loss, cross-transfer, contamination and/or deleterious change. After 60 consecutive days of no analysis or new requests for comparisons, a case is no longer considered "in the process of examination." Cases no longer in the process of examination should be closed and the evidence sealed properly until analysis resumes or a new service request is received.

Evidence Marking

Each piece of evidence or its most appropriate proximal container must bear the following identifiers:

1. Laboratory number (e.g. YYYY-00000)
2. Item number
3. Examiner's initials

Photographic Evidence

After evidence is examined and latent prints of value for individualization or elimination purposes are developed or noted, the latent prints will be preserved from change. A permanent record of all latent prints of value for individualization will be made by lifting, photography and / or by digital imaging when appropriate.

When latent print and impression evidence can only be recorded or collected by photography or digital imaging and the impression itself is not recoverable, the photographic/digital image must be treated as evidence. In these instances the digital image will be copied and locked onto suitable media and returned, along with the original evidence, to the submitting agency.

The Foray™ Digital Workplace will be used for the digital imaging and retention of latent prints and impression evidence when appropriate.

Individual Characteristic Databases

The Latent Print section utilizes the Automated Fingerprint Identification System (AFIS). Employees utilizing this database must receive proper training and/or clearance through the Arkansas State Police (ASP).

Database Samples

Individual characteristic database samples of the Latent Print Section include copies of ten print cards of known individuals. These ten print cards are treated as examination documentation. The known finger and palm prints of the AFIS are entered and controlled by the Arkansas State Police Identification Bureau. The records are stored according to State Identification Numbers (SID). The Arkansas State Crime Laboratory has no control over these records.

See Section 5.4 of this manual for procedures and information related to AFIS database samples and their identification.

Database Sample Access

Access to individual characteristic database samples is restricted to those employees authorized by the Executive Director. The Chief Latent Print Examiner will keep an updated list of employees that have access to the database samples.

Transfer of Evidence Items for Verification and/or Exclusion Purposes:

Evidence items, (e.g. latent print lifts, known fingerprint exemplars), transferred to another examiner for verification or exclusion purposes shall be recorded on LP-FORM-19 indicating date and time of transfer to the verifying examiner then back to the original examiner.

5.9 Assuring the Quality of Test Results

This section will contain quality control procedures to continually monitor and ensure the validity of test results. Quality control data will be recorded in a way to allow trends to be detected and whenever practical, statistical techniques will be used to review the data. The records should be retained to show that all appropriate quality control measures have been taken and are acceptable. The following is a list of quality control items that are utilized at the ASCL to ensure that ASCL test results are of the highest quality.

a) Regular use of certified reference materials and/or internally generated secondary reference standards.
b) Where appropriate, the use of positive and negative controls and internal standards.
c) 100% technical and administrative review of case records prior to issuance of the laboratory report.
d) Competency testing of analysts prior to beginning casework.
e) Annual proficiency testing of all analysts and technicians.
f) Replicate testing using the same or different methods, where practical.
g) Independent verification of all firearm identifications and eliminations.
h) Re-analysis of casework.
i) Annual courtroom testimony monitoring for all testifying analysts.

Quality Control Data

When quality control data is found to be outside the acceptable criteria, planned action shall be taken to correct the problem and to prevent incorrect results to be reported. If reagent does not meet the acceptable criteria, it will not be used; a new solution will be prepared, checked to determine if it is working properly and documented in the Latent Print Reagent Log. Instrument/ equipment that do not meet the acceptable criteria shall be removed from service until they have been repaired and re-calibrated, if necessary. Any adjustments made will be documented in the Latent Print Instrument / Equipment & Performance Verification and General Maintenance Logs.

Proficiency Testing

The Arkansas State Crime Laboratory maintains a proficiency testing program designed to provide independent evaluation of individual technical expertise, as well as a mechanism to monitor training needs and procedural weaknesses for both individual analysts and each discipline within the laboratory.

Technical review, verification and administrative review policies should be employed during proficiency testing as they are normally applied to casework. All parts of a proficiency test provided by an approved test provider should be examined as completely as the discipline's procedures allow.

Each analyst and technical support personnel engaged in testing activities shall successfully complete at least one internal or external proficiency test per calendar year in his/her forensic science discipline(s). The first analyst(s) taking the test will submit the results to the external provider before any of the succeeding analysts receive the test. This will be considered an External Proficiency Test. The remaining analysts will take the exam by the prescribed due date from the test provider. These tests will be considered Internal Proficiency Tests. (Note: The cases in Justice Trax will be restricted so that the other analysts taking the test cannot access the case).

Each analyst and technical support personnel engaged in testing activities shall be proficiency tested at least once during each five-year accreditation cycle, in each category of testing appearing on the ASCL's Scope of Accreditation, in which the individual performs testing. The categories of testing for the Latent Print discipline include:
- Latent Print Processing
- Latent Print Comparison
- Footwear/Tire Impression
- Individual Characteristic Database (AFIS)

The Latent Print discipline will successfully complete at least one external proficiency test annually. ASCLD/LAB approved test providers shall be used where available. If there is not an ASCLD/LAB approved test provider available, the ASCL will locate and use another source of an external test in the discipline.

The Chief Latent Print examiner or designee shall maintain a log of proficiency testing in each individual's Employee History Binder. This log shall contain the following:
- Individual's name
- Unique ASCL case number
- External proficiency identifier, if applicable
- Proficiency provider
- Date proficiency case file assigned
- Date test completed
- Date results reviewed

All internal and external proficiency tests will have a case file generated in Justice Trax. All administration and examination documentation will be in the assigned

electronic case file. This electronic version is considered the official proficiency case record. In addition, the following will be maintained in the case file:

- How the samples were obtained or created (after testing is complete and results have been received)
- Proficiency test results from the provider
- Corrective Action Request Form (ASCL-FORM-08), when applicable

The Chief Latent Print examiner or designee is responsible for comparing the analytical results to the expected results, determining if the analytical results are acceptable, and for reviewing these results with the analyst.

Proficiency/Competency tests that are internally prepared will be documented with the Latent Print Section Proficiency Preparation Form (LP-FORM-31) and scanned into the appropriate case file.

The following criteria shall be used for evaluating proficiency test results:

- All tests are graded as satisfactory or unsatisfactory.
- A satisfactory grade is attained when the experimental results match the expected results.
- If there is a discrepancy between the expected results and the experimental results, the Chief Latent Print examiner must notify the lab-wide QA Manager.
- Minor discrepancies may be deemed satisfactory based on the following factors with approval of the QA Manager:
  - Discipline interpretation guidelines
  - Consensus results

If the results are deemed to be unsatisfactory, the Section Chief must initiate a Corrective Action Request in Qualtrax.

Proficiency testing records will be retained for at least 15 years.

Case Review

All cases will be technically and administratively reviewed. The review process must confirm that electronic versions of all necessary documentation are in the imaging module of the LIMS plus program.

If a reviewer discovers an error in the case record, the reviewer must document the error on the ASCL Case Review Form (see LP-FORM-18) and inform the analyst. If the analyst and the reviewer cannot reach consensus, then both the analyst and reviewer must meet with the Section Chief (or designee) for resolution.

Technical Review

If the technical review is conducted by a qualified analyst who is not an employee of the Arkansas State Crime Laboratory, the reviewer must be from an accredited laboratory. The accreditation certificate for the laboratory and a CV for the individual conducting the review will be maintained on file (S:\Technical Reviewers).

Administrative Review

Administrative reviews may be conducted by any laboratory analyst or other individual qualified to perform technical review. The administrative reviewer of a case that has been technically reviewed by an outside agency will push the technical review in the LIMS before proceeding with the administrative review. The administrative reviewer will ensure that the completed review form has been scanned into the case file.

Refer to section 5.9.4 and 5.9.5 of the ASCL Quality Manual (ASCL-DOC-01) for more information on Technical and Administrative Reviews.

Refer to Section 5.9.6 and 5.9.7 of the ASCL Quality Manual (ASCL-DOC-01) for information on Testimony Reviews.

5.10 Reporting the Results

General

When analytical conclusions and/or opinions are made on evidence submitted for analysis, a 'Report of Laboratory Analysis' will be issued to the investigating agency. The results shall be reported accurately, clearly, unambiguously and objectively. Analytical findings and conclusions shall be reported for each specific item of evidence that was examined. Each analyst/examiner will proofread and sign their reports ensuring the report is accurate and error-free. LIMS allows the analyst to sign their reports electronically.

See ASCL Quality Manual (ASCL-DOC-01) for Laboratory Report Exceptions.

Reports

See ASCL Quality Manual (ASCL-DOC-01) for minimum requirements of information to be contained on the laboratory report.

Reports (additional requirements)

The following information should be addressed in all Latent Print Section Reports.

- Latent print/footwear/tire impression(s) present or developed on evidence should be specifically identified and reported as to what type and how many of each type were found on each Item.

- If needed, Latent Print Examiners should request appropriate additional record (e.g. finger, palm, finger and palm) prints in the ASCL laboratory report.

- Latent print examinations and comparisons can be limited in scope from what is specified in the "Analysis Requested" box on the ASCL Evidence Submission Form (ASCL-FORM-12) only after coordination with the submitter. If a limited examination / comparison is conducted, the identity of the individual with whom the action was coordinated, the date, and a clear explanation should be given in the ASCL Agency Contact Form (ASCL-FORM-06), the ADAMS Telephone Conversation Log or documented email and included in the case file. The explanation should be referenced on the laboratory report as well.

- All examination results shall be reported. When comparative Latent Print, Footwear and Tire examinations result in an association or exclusion or inconclusive result, the report shall clearly communicate the result.

- **Exclusions**
    - When comparative examinations result in the exclusion of an individual or object, the report shall clearly communicate the exclusion. Please see Suggested Report Formatting in the relevant Additional Statements in this section for reporting suggestions.

- **Inconclusive Results**
    - When results are inconclusive, the reason shall be clearly documented in the examination record. Latent Print Worksheet (Lifts / Images) (LP-FORM-19) has a checklist for reasoning, as well as a "Notes" section where this reason shall be documented. If the examination record is generated with the ADAMS ACE-V Documentation Module, the reason shall be documented within the module and resulting records. Latent Print Worksheet (Footwear) (LP-FORM-21) and Latent Print Worksheet (Tire) (LP-FORM-22) also have a "Notes" section where this reason shall be documented.

- **Opinions and Interpretations**
    - The following statement will appear on all laboratory reports, "The following represents the interpretations/opinions of the undersigned analyst."

Additional Statements
In an effort to standardize report writing in the Latent Print Section the following suggested phrasing is provided. It is recognized that these phrases will not fit every reporting situation; exceptions are permissible. Examiners are encouraged to use this standardization in their notes and reports, but it is also recognized that some discretion is allowed for the variances of case circumstances.

Latent Finger/Palm Prints Standardized Report Wording

Associations
LATENT FINGER/PALM PRINTS EXAMINATION RESULTS

Latent print comparison results NEVER include qualified conclusions. There are only three possible latent print examination conclusions which will be used in reports generated by the ASCL Latent Print Section. The conclusions of individualization and exclusion will be documented in notes and in reports; however, the determining factors need not be included in reports. Reasons for reaching inconclusive conclusions must be documented in notes and included in reports.

Unknown ridge detail should be referred to as "latent prints" in the case report. They may be referred to as latent fingerprints, latent palm prints, latent impressions, patent impressions, plastic impressions, etc., if the terminology clarifies a portion of the case report.

Suitable ridge detail that is not compared or analyzed must be indicated in the case report.

Latent print lifts created by the Latent Print Section must be returned to the submitting agency and indicated in the case report.

Individualization - Individualization is the decision by a Latent Print Examiner that there are sufficient features in agreement to conclude that two areas of friction ridge impressions originated from the same source.

Suggested Reporting Format:

- The E-2 latent print lift contains a latent fingerprint/palm print that exhibits sufficient unique characteristics to allow individualization to its source. OR:
- Examination of Item(s) 5A through 5D revealed two (2) latent finger/palm print(s) (or simply 'latent print(s)' if origin unknown; finger or palm) each on Item(s) 5A and 5C suitable for individualization purposes.
- The Item(s) 5A and 5C identifiable latent prints was/were searched in the AFIS with positive results.
- The latent finger/palm print(s) (or latent print(s)) on Item(s) 5A and 5C have been individualized to XXXXXX.
- All latent prints that are suitable for individualization in this case have been identified to their respective source.
- Per communication (e.g. email, telephone conversation) with (name and position) on XX date, a limited comparison of Item(s) 5A through 5D was conducted and revealed XXXXXX made at least one latent finger/palm print(s) (or print(s)) on Item(s) 5A and 5C.
- The record prints of XXXXXX were compared with the previously reported unidentified latent prints on Item(s) 5A and 5C. The latent finger/palm print(s) (or print(s)) on Item(s) 5A and 5C have been individualized to XXXXXX.
- **ME / LP request:** The inked finger/palm prints submitted have been individualized to XXXXXX.
- **ME / LP request:** The imaged friction ridge skin of the decedent has been individualized to XXXXXX.

Exclusion - Exclusion is the decision by the Latent Print Examiner that there are sufficient features (class and / or individual characteristics) in disagreement to conclude that two areas of friction ridge impressions did not originate from the same source. Source refers to the area of friction skin. Exclusion of a subject can only be reached if all relevant comparable anatomical areas are represented and legible in the known exemplars. Notes and reports shall clearly state if the exclusion refers only to the source or the subject.

Suggested Reporting Format:

- Examination of Item(s) 3A through 3C revealed one (1) latent finger/palm print(s) (or simply 'latent print(s)' if origin unknown; finger or palm) each on Item(s) 3A and 3B suitable for exclusion purposes only. *(Use this statement if sufficient class characteristics (e.g. pattern type, minimal minutiae) exist to allow for exclusion of a potential source, but sufficient unique characteristics in sequence do not exist to allow for an individualization to be made).*
- The E-3 latent print lift contains a latent finger/palm print that exhibits sufficient class characteristics to allow possible exclusion of a suspected source. The E-3 latent print is not the fingerprint of _____.
- The individuals listed above did not make any of the latent finger/palm print(s) (or print(s)) on Item(s) 3A and 3B.
- XXXXXX is not the source of the latent finger/palm print(s) (or print(s)) on Item(s) 3A and 3B.
- Comparison of the record prints of XXXXXX with previously reported unidentified latent prints on Item(s) 3A and 3B revealed that XXXXXX is not the source of these latent prints.

Inconclusive -An inconclusive conclusion can occur when a Latent Print Examiner is unable to individualize or exclude due to an absence of complete and legible known prints (e.g., poor quality fingerprints and lack of comparable areas). In such an instance, the inconclusive conclusion means that the impression needs to be reexamined and compared using clearly and completely recorded known impressions.

Inconclusive also encompasses those situations when the questioned impression(s) may be suitable for individualization but the conclusion to either individualize or exclude cannot be made (e.g. unable to determine friction ridge orientation).

Inconclusive conclusion can also result when corresponding features are observed but not sufficient to individualize, or in the same instance dissimilar features may be observed but not sufficient to exclude (unable to explain whether a specific ridge event [or sequence of events] constitutes a discrepancy or dissimilarity). The inconclusive conclusion here means that the unknown impression was neither individualized nor excluded as originating from the same source.

Suggested Reporting Format:

- The record finger/palm print(s) of XXXXXX was/were compared insofar as possible with the latent finger/palm print(s) (or print(s)) on Item(s) 4A and 4E without effecting individualization. Please submit additional complete and legible record finger/palm print(s) of XXXXXX if a complete comparison (exclusion or individualization) is desired. Include all friction ridge skin areas of the fingertips, lower joints, palms, etc. in any additional record prints submitted for comparison in this case under this laboratory case number.
- Comparison of the latent finger/palm print(s) (or print(s)) on Item(s) 4A, 5C, and 6A with the submitted record finger/palm print(s) of XXXXXX were made insofar

as possible without effecting an individualization or exclusion due to XXXXXX. (*Refer to inconclusive reasons listed above.)*

- Latent finger/palm print(s) (or print(s)) suitable for individualization are not always suitable for the Automated Fingerprint Identification System (AFIS) searches. The latent finger/palm print(s) (or print(s)) on Item(s) 4A and 4E was/were entered into the AFIS with positive/negative results. The remaining latent finger/palm print(s) (or print(s)) were not AFIS suitable and not entered into the AFIS.
- Latent finger/palm print(s) (or print(s)) suitable for individualization are not always suitable for the Automated Fingerprint Identification System (AFIS) searches. The latent finger/palm print(s) (or print(s)) on Item(s) 5C and 6A was not / were not AFIS suitable and not entered into the AFIS.
- The ***COMPLETE*** and ***CLEARLY RECORDED*** inked fingerprints and palm prints, including the *(specify anatomical location)*, of any suspected source of the Item(s) 5C and 6A identifiable latent print(s) and the original lift(s)/items of evidence should be submitted under this laboratory case number if additional analysis *(or comparison for possible exclusion, if applicable)* is needed.

PROCESSING AND EXAMINATION:

This section details the processing examinations (e.g., visual, chemical and/or physical) and results for each item. The results shall include the number of latent prints recovered from each item. Every latent captured for analysis shall be designated a number regardless if it is of value for individualization**.**

The below statements can be used for an item that was physically and/or chemically processed:

- *Item 1 was* visually examined and physically and/or chemically processed.
- *Item 1 was* visually examined, physically and/or chemically processed, and viewed with an alternate light source.

The below can be used for an item that was determined not to be suitable for processing:

- *Item 1 was* visually examined and determined not to be suitable for processing.

The below can be used for a submitted lift card, photographs or resubmitted digital media in which a visual exam only was conducted:

- *Item 1 was* visually examined and not used for comparison.

The below can be used for exemplars:

- *Item 1 was* visually examined and not used for comparison.
- *Item 1 was* visually examined, preserved in the digital imaging system, and used for comparison.

PROCESSING AND EXAMINATION RESULTS:

Statement related to the examinations performed as a result of the processing techniques performed on each Item. The below examination statements will directly follow the above processing statements.

The below can be used when ridge detail is visible but is of no value for individualization:

- No latent prints of value for individualization were observed and/or developed.

The below can be used when no ridge detail is visible:

- No latent prints were observed and/or developed.

The below can be used when ridge detail is captured. The number of latent prints captured shall be documented for each item processed:

- *One* latent print was lifted.
- *Two* latent prints were digitally captured.
- *Five* latent prints were lifted and/or digitally captured.

Additional Suggested Statements to be used when applicable:

- No latent prints suitable for individualization purposes were present or developed on Item(s) 2B and 3B.
- The remaining latent prints present or developed on Item(s) 1A and 2C that were submitted are not suitable for individualization or exclusion.
- Images of the described latent print(s) in this case will be retained in the laboratory file.
- The evidence listed and described above was examined and processed for latent prints. Results did not yield any latent prints suitable for individualization (or exclusion if applicable).

Footwear/Tires Standardized Report Wording

FOOTWEAR/TIRES EXAMINATION RESULTS

Qualified conclusions are allowable and common concerning footwear and tire comparisons. Conclusions regarding footwear and tire examination findings are limited to the following:

Identification - The conclusion that the particular shoe or tire made the impression to the exclusion of all other shoes or tires.

Suggested Reporting Format:

- The latent footwear/tire impression(s) on Item(s) 1A were made by Item 2B (shoe/tire).

Exclusion - The conclusion that the source of the known impression is not the source of the questioned impression.

Suggested Reporting Format:

- None of the footwear/tires submitted made the latent footwear/tire impression(s) on Item(s) 1A and 1B.

Qualified conclusion - The questioned latent footwear or tire impression bears similar design and class characteristics as the submitted footwear or tire. A more definitive conclusion (identification or exclusion) cannot be made due to a lack of discernible individual characteristics. The following are examples of qualified conclusions:

- **"Could have made" (significant association of multiple class characteristics)** – this opinion means that the design, physical size and/or wear correspond with the respective portions of the submitted known shoe(s) or tire(s) and could have been made by the shoe(s) or tire(s) or other shoes or tires or similar design, physical size and/or wear. Due to the lack of detail in the impression, a more positive association could not be made.

- **"Cannot be eliminated" (minimal detail in the impression)**-this opinion means there is minimal detail in the impression that corresponds with respective portion of the submitted shoes or tires or other shoes or tires with the same minimal detail.

Casts created by the Latent Print Section must be returned to the submitting agency and indicated in the case report.

Suggested Reporting Format:

- A search of footwear databases available to ASCL revealed a (brand make/model) (footwear/shoe/boot) outsole design with the same class characteristics as the latent footwear impression(s) on Item(s) 1A and 1C.
- A search of tire databases available to ASCL revealed a (brand/make/model) tire tread design with the same class characteristics as the latent tire impression(s) on Item(s) 1A and 1C.
- The latent footwear impression(s) on Item(s) 1A and 1C could have been made by Item(s) 2A and 2B (left/right shoe) as they have similar class characteristics. A more definitive conclusion (individualization or exclusion) could not be made due to a lack of discernable individual characteristics in the impression(s).
- The latent tire impression(s) on Item(s) 1A and 1C has/have similar class characteristics as Item(s) 2A and 2B. A more definitive conclusion (individualization or exclusion) could not be made due to a lack of discernable individual characteristics in the impression(s).
- The latent footwear impression(s) on Item(s) 1A and 1C has/have an outsole design similar to a (brand/make/model) (footwear/shoe/boot). A more definitive conclusion on the (brand/make/model) of the (footwear/shoe/boot) could not be made due to the ubiquitous use of this design by numerous footwear manufacturers.
- The Item 1A questioned impression corresponds in physical size, design, general wear, and some individual characteristics with the known left/right shoe and was probably made by this shoe.

Inconclusive - Some similarities between the known and questioned impressions are noted; however, there are significant limiting factors in the questioned impression that do not permit a specific association between the questioned impression and the known shoe or tire.

Suggested Reporting Format:

- Due to the common nature (plain herringbone pattern) of the latent impression on Item (s) 1A and 1C and the ubiquitous use of this design by numerous footwear manufacturers, a potential make and model of footwear could not be determined for the latent footwear impression(s). Submit any footwear collected in this case that have a similar outsole as depicted below.
- The size of the footwear that made the latent footwear impression could not be determined since the entire heel-to-toe length was not captured in the impression.
- The latent footwear impression(s) on Item 1A and 1C has/have similar design features as Item(s) 2A and 2B (left/right shoe), however, due to the lack of sufficient detail and/or proper scale, a more conclusive association was not made.
- In some cases impressions are not clearly distinguishable, and while footwear or tires could have made them, there still exists the possibility that they were made by some other object. In these cases, it should be reported that the examination

revealed "one latent impression of an unknown origin (possible footwear or tire impression)".
    - Examination of Item(s) 1A through 1C revealed three (3) impression(s) of unknown origin (possibly footwear or tire impression) suitable for comparison.

Additional Suggested Statements to be used when applicable:

- Examination of Item(s) 1A through 1C revealed three (3) latent footwear/tire impression(s) on Item(s) 1A suitable for comparison.
    - When reporting footwear or tire impressions that are suitable for comparison, it may be important to advise submitters that "Footwear or tire impressions suitable for comparison are not always suitable for identification but may be suitable for exclusion purposes."
- A search of footwear databases available to ASCL did not reveal an outsole design with the same class characteristics as the latent footwear impression(s) on Item(s) 2A and 2B.
- A search of the tire databases available to ASCL did not reveal a tire tread design with the same class characteristics as the latent tire impression(s) on Item(s) 3A and 3B.
- Impressions of unknown origin (possibly footwear or tire impression) suitable for comparison are not always suitable for individualization but may be suitable for exclusion purposes.
- Please submit any footwear with an outsole design similar to that depicted below for future comparisons.
- Insufficient detail was present in the questioned impression to enable any meaningful comparison with any known shoe or tire.

The conclusions of individualization and exclusion will be documented in notes and in reports; however, the determining factors need not be included in reports. Reasons for reaching inconclusive conclusions must be documented in notes and included in reports.

LATENT-TO-LATENT COMPARISONS OF FRICTION RIDGE SKIN

Latent-to-latent comparisons of friction ridge skin impressions are not conducted on a routine basis and any request for latent-to-latent comparisons must be coordinated with and approved by the Latent Print Section Chief.

- If approved to conduct a latent-to-latent comparison, ***only*** positive conclusions are reportable. AFIS assistance should be utilized in these types of examinations to assist with large volume searches.
- No conclusions will be reached and reported regarding any negative findings.
- Latent prints analyzed as not suitable for individualization will not be compared with other latent prints.
- Examples of conclusions rendered in latent-to-latent comparisons are as follows:

- The latent prints in this case are not suitable for latent-to-latent comparisons.
- The latent fingerprints on Item(s) 1A and 1B were made by the same source.
- The latent print on Item 1A in this case was identified as having been made by the same source as the latent print on Item 2C in case number _____ during an AFIS search, but the source was not identified.
- No conclusion can be made regarding the remaining latent prints on Item(s) 1A through 1C in this case as they are not suitable for a latent-to-latent comparison.

LATENT-TO-LATENT COMPARISONS OF FOOTWEAR AND TIRE IMPRESSIONS

Latent-to-latent comparisons of footwear and tire impressions are not conducted on a routine basis and any request for latent-to-latent impression comparisons must be coordinated with and approved by the Latent Print Section Chief.

- If approved to conduct a latent-to-latent comparison, positive and qualified conclusions of partial and complete latent footwear and tire impressions are reportable.
- If only partial latent footwear and tire impressions are submitted or developed, no conclusions will be reached and reported regarding any negative findings.
- Latent footwear and tire impressions analyzed as not suitable for comparison will not be compared with other latent impressions.
- Examples of conclusions rendered in latent-to-latent footwear and tire impression comparisons are as follows:
  - The latent (footwear/tire) impressions in this case are not suitable for latent-to-latent impression comparisons.
  - The latent (footwear/tire) impressions on Item(s) 2A and 1C were/could have been made the same source.
  - The latent (footwear/tire) impressions on Item 2A in this case was identified as having been made /could have been made by the same source as the latent (footwear/tire) impressions on Item 1B in case number _____.
  - No conclusion can be made regarding the remaining latent
  - (footwear/tire) impressions on Item(s) 1A through 1C in this case as they are not suitable for a latent-to-latent comparison.
  - The latent (footwear/tire) impressions on Item 2A in this case could not have been made by the same source as the latent (footwear/tire) impressions on Item 1B in case number _____.

Report/Testimony on Work of Other Analysts

Latent Print analysts issuing a report based on the examination records generated by another individual shall complete and document a review of all relevant pages of documentation in the case record. This will be conducted by the reporting analyst and will include initialing and dating each page of the examination record and the use of a

review statement (i.e. "SOP compliant / XXX concurs with results and conclusions") to be documented at minimum on the first or last page of the examination records. .

The same documented review shall be conducted in the cases that both a Latent Print Technician and a Latent Print Examiner have produced examination records. This review statement should be documented by the Latent Print Examiner to include compliance with the discipline SOP and initialed and dated concurrence when applicable (i.e. "SOP compliant/XXX concurs with results and conclusions"). The Latent Print Examiner shall initial each examination record completed by the Latent Print Technician in the case file.

If examination records are generated in the ADAMS ACE-V Documentation Module, Latent Print analysts issuing a report or additional documentation based on the examination records generated by another individual shall complete and document a review of all relevant pages in the case record. This review shall be documented by the Latent Print Examiner using the *LP Examination Record Review Form* (LP-FORM-32) and included in the case record.

Latent Print analysts testifying based on the examination records generated by another individual shall complete a *Court Case Review Form* (ASCL-FORM-57) on the particular case prior to testifying.

Report Format

Latent Print Section reports are generated using the LIMS and will be formatted in a manner to accommodate the types of tests conducted and to minimize the possibility for misunderstanding or misuse. The Latent Print Section Chief will ensure that discipline report designs are optimized for the clear presentation of test results.

Laboratory reports are often read by persons who have little experience with latent print examinations and are not familiar with how the results of these examinations are reported. Therefore, all reports should be simple, accurate, and complete. Whenever possible, reports should stand alone without referring to other documents.

See ASCL Quality Manual (ASCL-DOC-01) for Supplemental and Amended Reports.